ELECTRICAL TIMES

THURSDAY
20 APRIL
1950
SIXPENCE

HENLEY *Modern*

DISTRIBUTION PILLARS AND PANELS

GROUP 24

Embodied in the new HENLEY Distribution Pillars are all those features that keen distribution engineers are looking for, together with a shell of modern pleasing appearance.

Robust cast-iron construction throughout with detachable plinth and roof.

Adequate provision for ventilation.

One-piece insulating right-angle type shields acting as phase barriers and vertical front shields for busbars.

Four sizes of Units are available, 200 to 1,000 amp, suitable for 3-phase 4-wire systems with cartridge fuse-link protection up to 60 amp for fifth core, if required. Units for other systems can be supplied.

One-piece insulators with specially designed entry to facilitate insertion or removal of conductor fittings.

Conductor fittings are reversible and interchangeable. Crossing of conductor cores is avoided.

Height 3' 11" above ground. Depth 14½".

Enquiries invited. Please ask for Folder 24/A.

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

Examples of our many activities. The pump impeller is a Panilax Resin Moulding and is supported upon rolls of Mica tape and Empire tape. The punchings include Micanite, Paxolin Laminated and Mica.

m and i

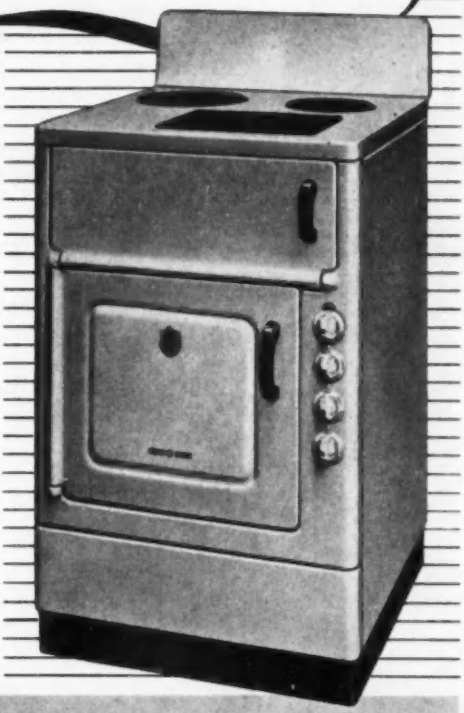
THE MICANITE & INSULATORS CO. LTD.
Empire Works, Blackhorse Lane, Walthamstow, London, E.17
Branch offices at Birmingham, Cardiff, Glasgow, Manchester and Newcastle-upon-Tyne and representatives in most countries throughout the world.

Manufacturers of MICANITE (Built-up Mica Insulation). Fabricated and Processed MICA. PAXOLIN Laminated Materials. PANILAX Laminated Materials and Mouldings. EMPIRE Varnished Insulating Cloths and Tapes. HIGH VOLTAGE BUSHINGS and TERMINALS. Distributors of Micaflex-Duratube Sleevings and Micaflex-Durasleeve (Plastics-covered flexible metal conduit).

'ENGLISH ELECTRIC' COOKERS

for the kitchen-proud housewife

Model 2009 illustrated has extra-large oven



- Balanced-heat oven with Ritemp thermostatic control.
- Rapid boiling or slow simmering.
- Pilot-light indication.
- Cast-iron construction for strength and long life.
- Attractive finish in two shades of cream vitreous enamel.

Literature of ENGLISH ELECTRIC Domestic Appliances will be sent freely on request.

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Domestic Appliance Sales Department

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BRITISH INDUSTRIES FAIR, BIRMINGHAM—STAND C613/512

A

...the source and distribution of power

"From coal to cables" is the story, in a nutshell, of the generation of electrical energy. As the quality of the coal is vital in providing the means of generation, so are the cables vital in providing the means of distribution; and when the name on the cables is HACKBRIDGE the user is assured that the final link in the chain of electrical power is a firm and enduring one.

HACKBRIDGE *Cable Company Limited*

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The demand for increased production calls for the efficiency and accuracy of Gledhill-Brook Recorders.

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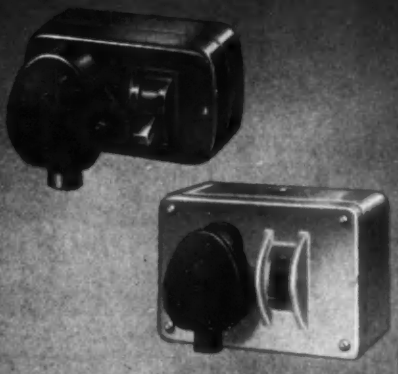

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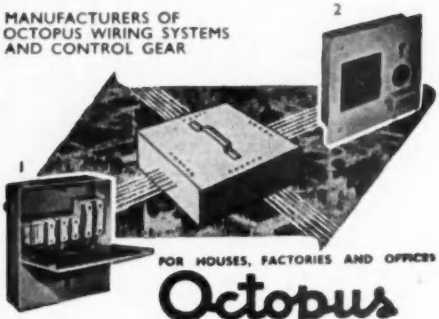

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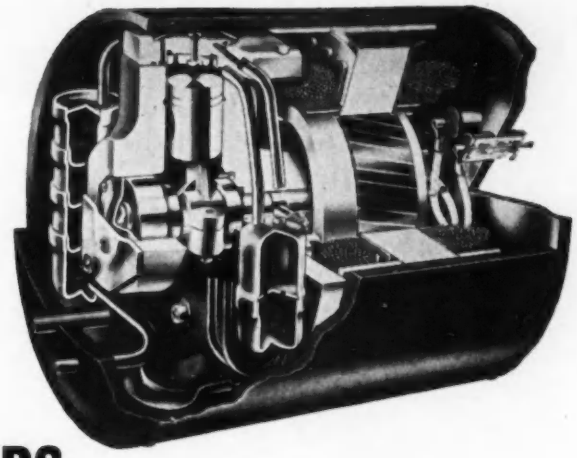

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about the Coldrator Sealed System...

. . . THE HEART of the Coldrator All moving parts are permanently and hermetically sealed in steel: no dirt, air or moisture can reach them No periodical inspection, no maintenance of any sort is needed—not even oiling

And that's not all: the sealed system unit is really compact—so there is much more storage space in the Coldrator cabinet. Out of sight—out of mind—and almost out of hearing—that's the B.T.H. designed sealed system

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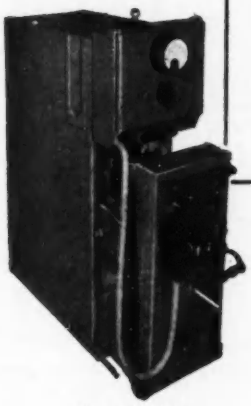

The 'BV' Unit

One of the
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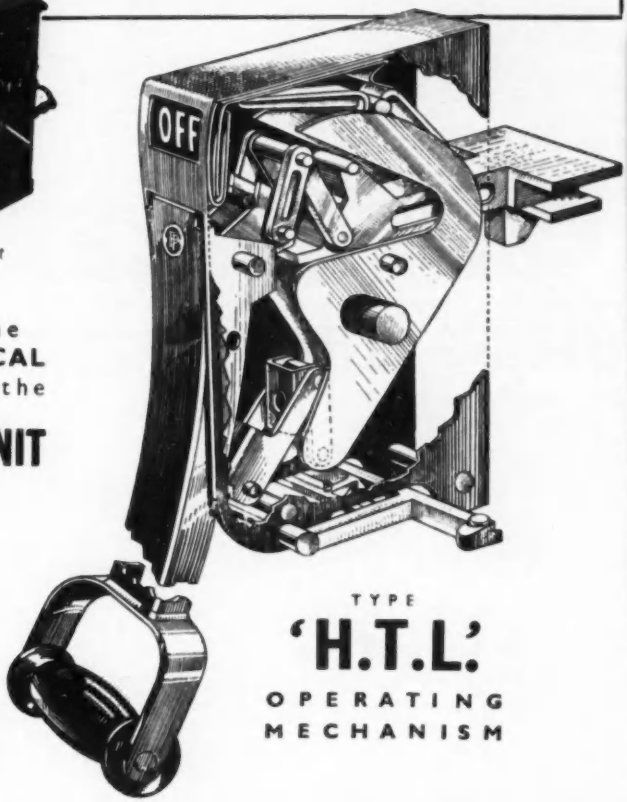

TYPE
'H.T.L.'
OPERATING
MECHANISM

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These new Cold Cathode Lamps combine the advantages of instant starting, high efficiency and considerably longer life than has hitherto been available. Made in a variety of colours and combinations in single 10 ft. tubes, 5 ft. U-tubes and 3 ft. grid tubes. Write for full details of the Meico range of Cold Cathode Luminaires.

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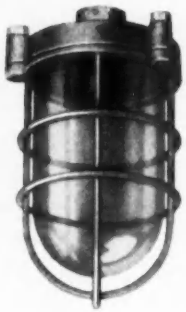

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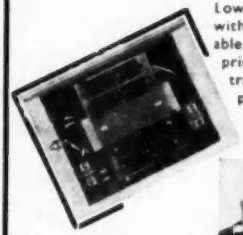

Low Voltage Lighting Unit with lid removed. Suitable for M/c tools, comprising double-wound transformer with fused primary and secondary D.P. on-off switch, housed in steel case.

Low Voltage Portable Transformer suitable for hand-lamps, portable m/c tools, etc. Fitted with Reyrolle plugs and sockets and carrying handle.

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- ★ EASY CONVERSION FROM 2 TO 3 PLATE.

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The Cooker that has everything

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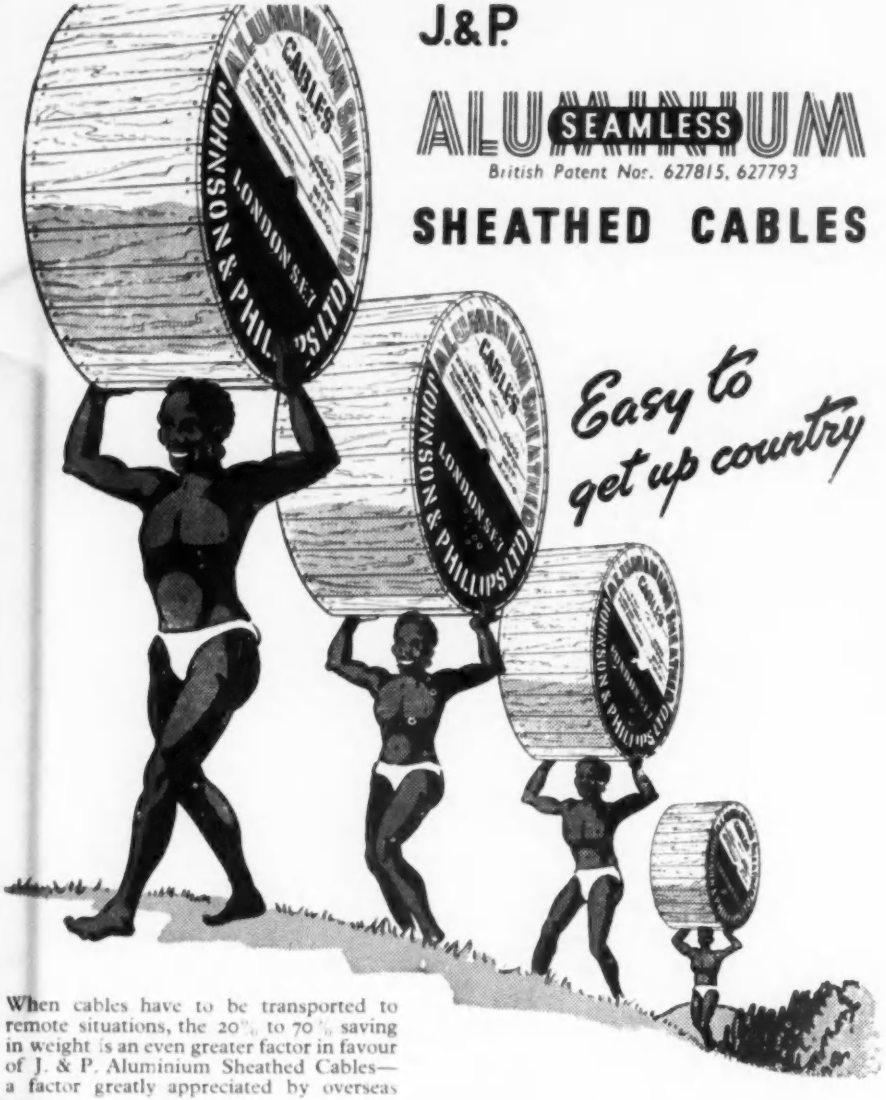
ALUMINIUM SEAMLESS

British Patent Nos. 627815, 627793

SHEATHED CABLES



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When cables have to be transported to remote situations, the 20% to 70% saving in weight is an even greater factor in favour of J. & P. Aluminium Sheathed Cables—a factor greatly appreciated by overseas users.

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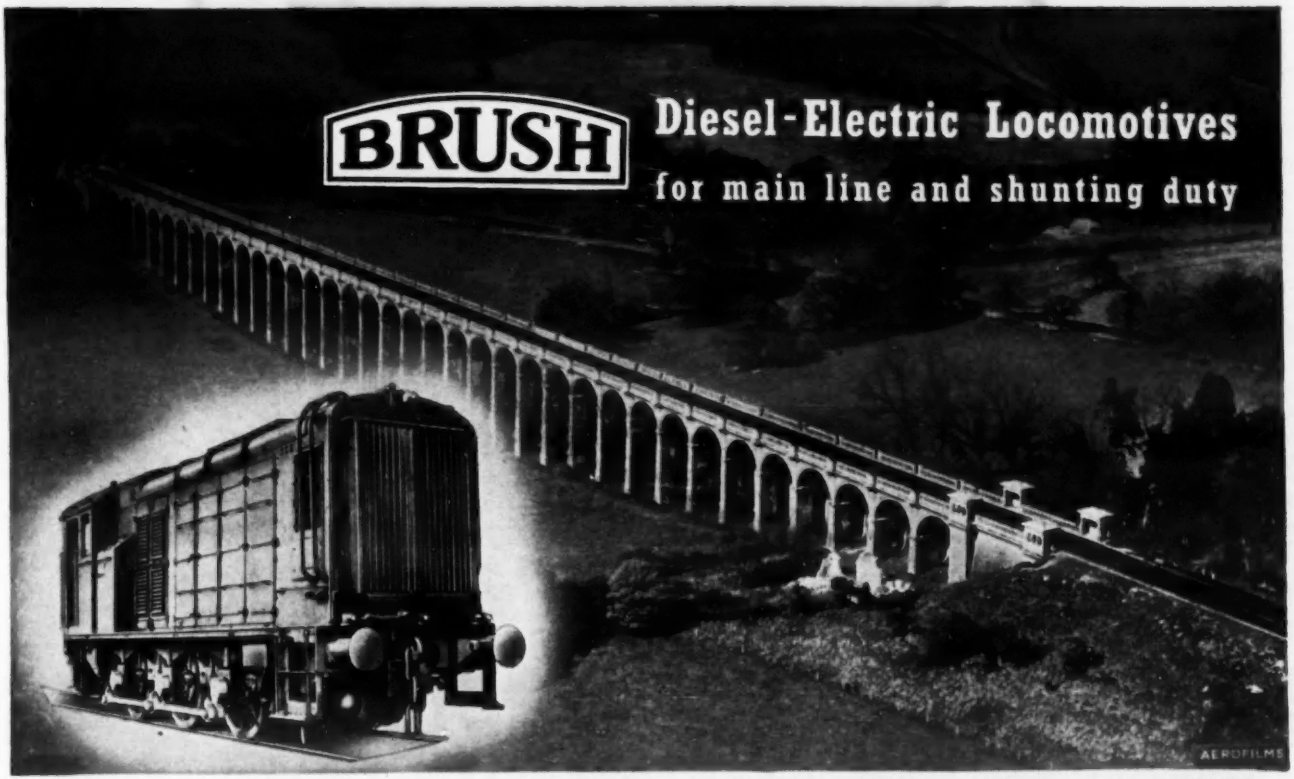

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15·2

NOW *the Series 4*
'MEGGER' INSULATION TESTER

- **CONSTANT PRESSURE GENERATOR** — giving steady readings when testing cables having electrostatic capacity, or circuits fitted with suppressors.
- **VOLTAGE RANGE UP TO 500.** Insulation range up to 50 megohms.
- **DIVIDE BY 100 SWITCH** or alternatively a continuity range.
- **LIVE LINE DETECTOR** for protection when testing the continuity of conduit on live circuits.
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The Series 4 is a completely new Megger Insulation Tester, combining all the characteristics of this famous make with certain features hitherto available only on the larger and costlier Megger instruments. **Full details in Publication No. J051/5.**

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with the well-known Pullin Iron-free dynamometer movement combines the functions of a Precision Indicating Ammeter, Voltmeter and Wattmeter. Covers an extremely wide range to fine limits of accuracy:—

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6 Ampere-Ranges from 0.5 to 25 (a.c. only). Accuracy ±0.5%.

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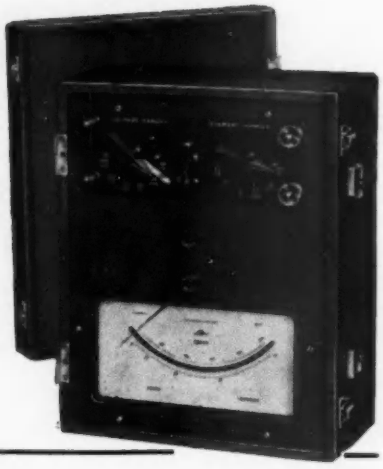

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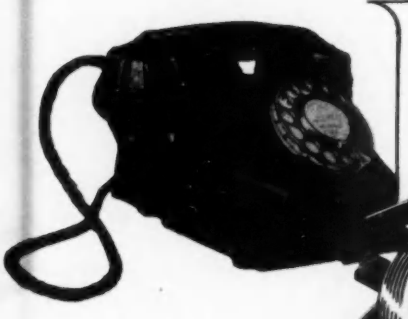

The large figure quoted above is the number of telephone calls made on 4,919,000 instruments during the year ending March 31, 1949. As part of their "aid to efficiency" service, Symonds supply high quality copper wire to the manufacturers of telephone cables for indoor and outdoor use.

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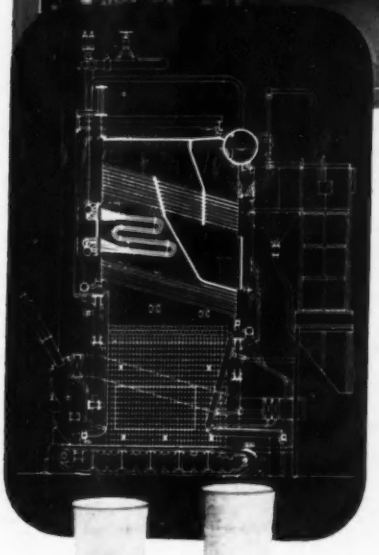

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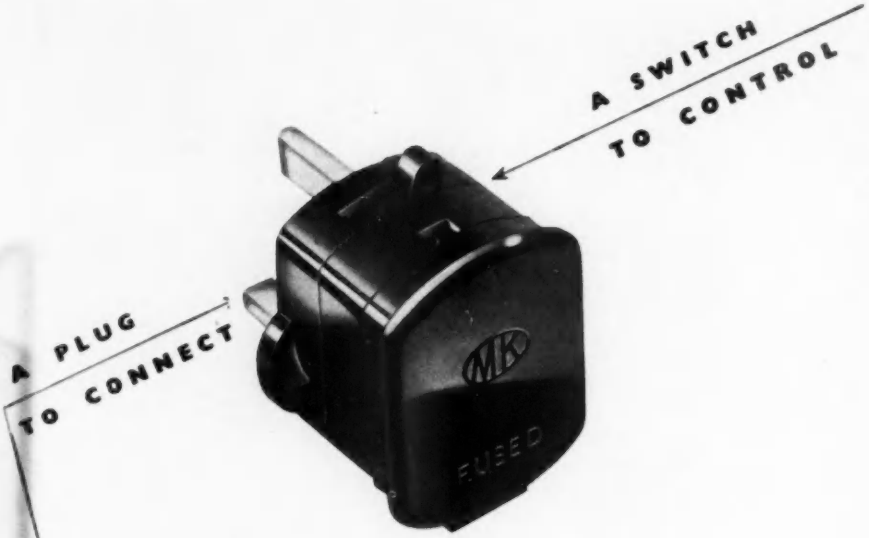

The M.K. fused-switch plug for 13 amp. rectangular pin socket-outlets provides consumers with a convenient control switch—so desirable for use with Electric Fires, Kettles, Toasters, Irons, etc. No larger in girth and only slightly deeper than an ordinary fused-plug — yet embodies in a sealed chamber an efficient A.C. switch which will easily cope with 3 k.w. loads (13 amps. 250 volts). Capable also of being operated over 100,000 times without failure. Self-indicating switch handle ideally positioned for finger-tip control. To B.S. 1363 : 1947

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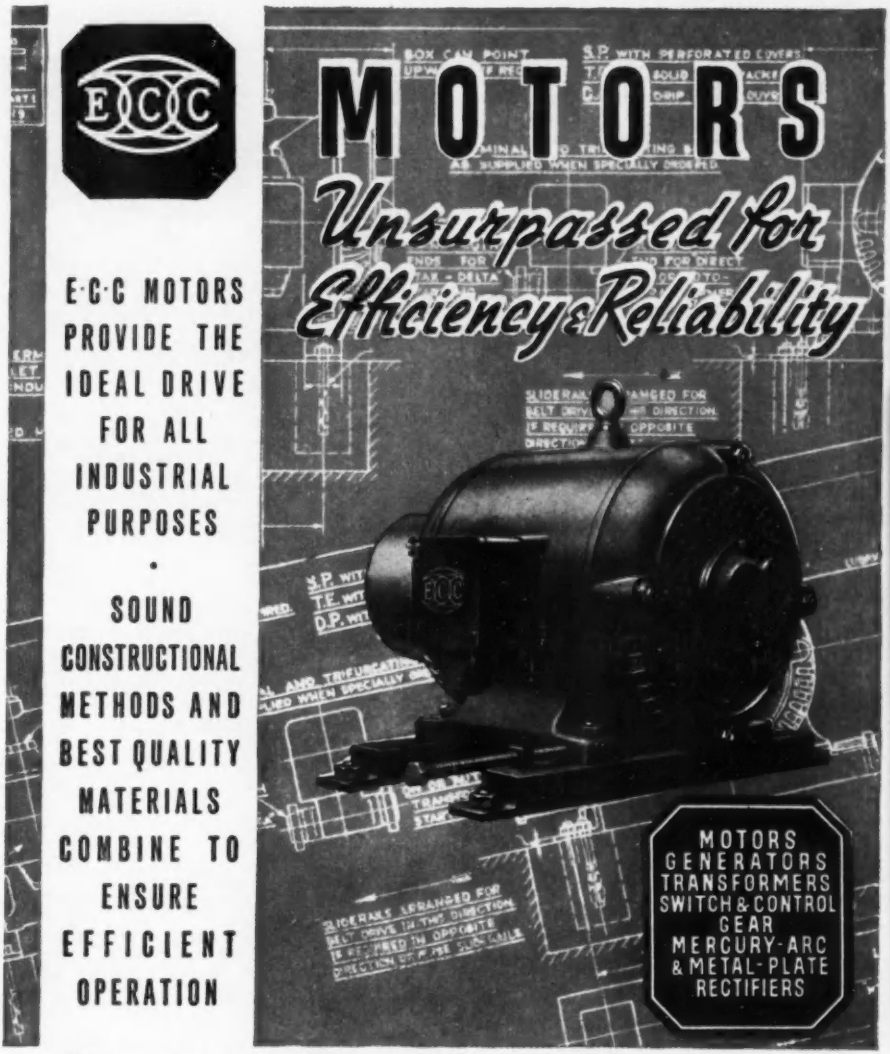

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Monarch

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The Simplex range of iron-clad switch and distribution gear includes 'Monarch' switches and switch fuses 100/150 amp. and 200/300 amp. capacity, 500 volts double pole, triple pole, and triple pole and neutral types

MADE BY THE HOUSE OF

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A COMPANY

WEIR

"OPTIMUM"

DE-AERATOR

Gases dissolved in otherwise pure feed water cause corrosion in boiler tubes, economiser tubes, turbine blades, etc., and unless eliminated can be the cause of serious and expensive troubles. The Weir "Optimum" De-aerator provides an economic and highly efficient solution to the problem by eliminating the corrosive gases, and retaining in the feed water the heat in the operating steam. Technical details and various arrangements of De-aerator fully described in Publication No. GH.37, "Eliminating Corrosion in the Power Plant."

G. & J. WEIR LTD.
CATHCART GLASGOW

A dual connection, allowing you to plug in 2-amp or 5-amp fuse plug while 15-amp plug is in use.

More than this—

If 15-amp plug is NOT in use, you can insert 2-amp or 5-amp fuse plug direct in Socket. I.e., one 15-amp Socket gives 5 different connections:—

Also available for WYLEX Ring Main

WYLEX

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"Must be Good"

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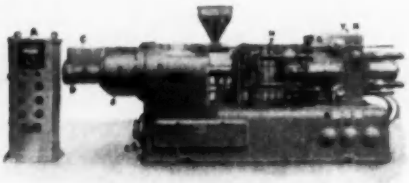

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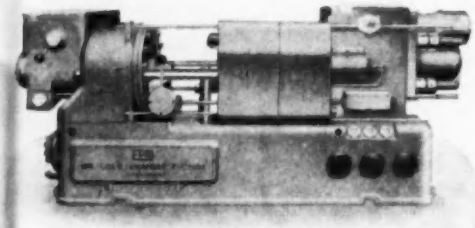

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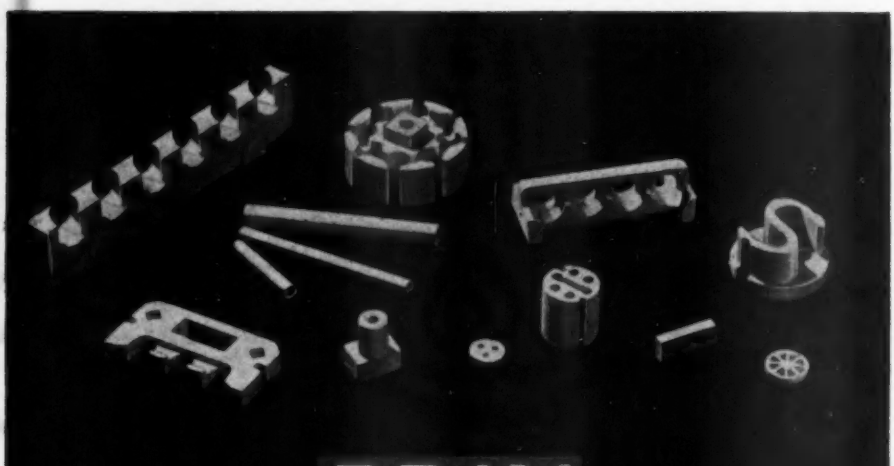

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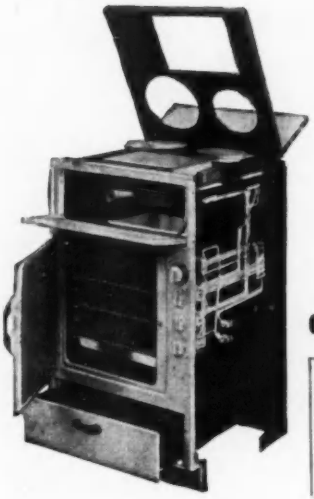

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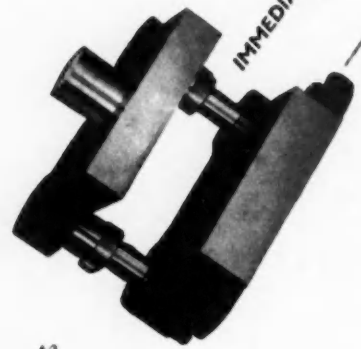

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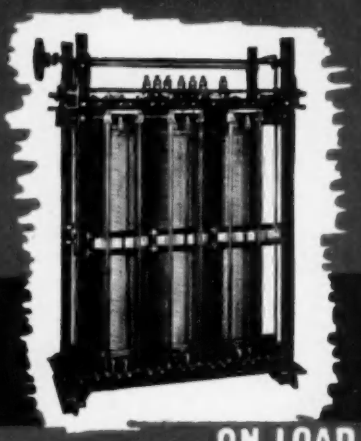

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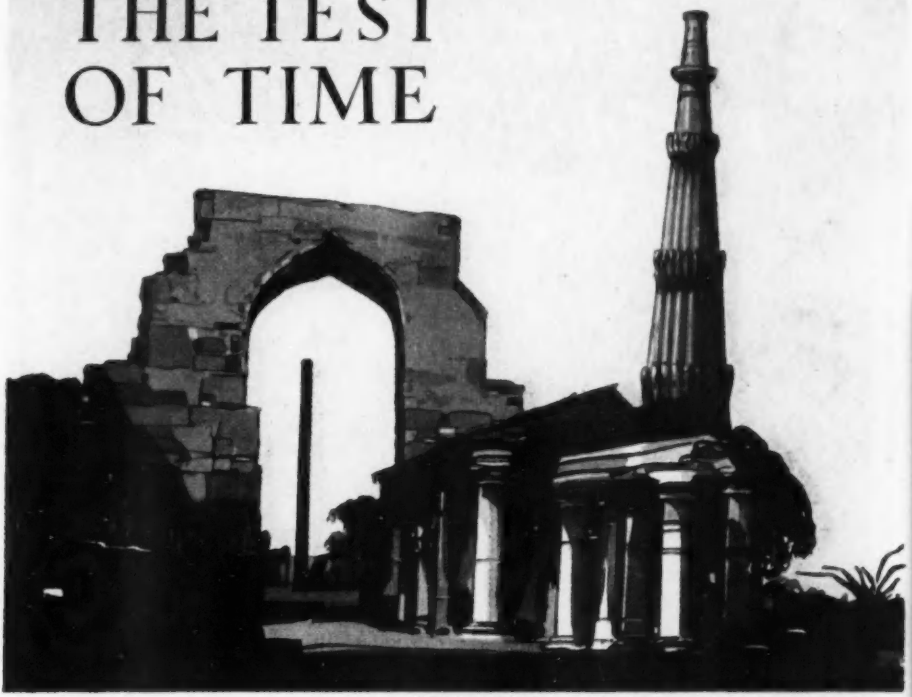

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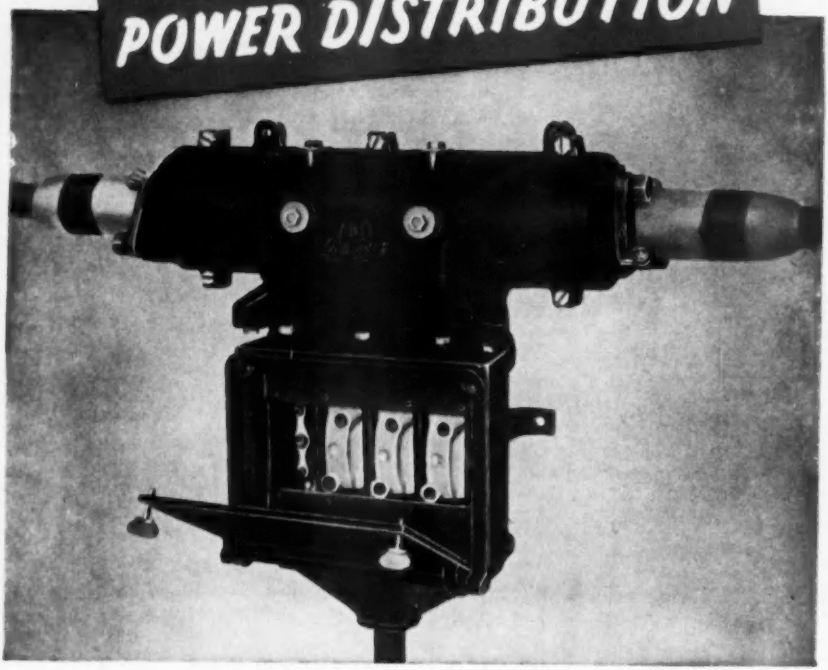

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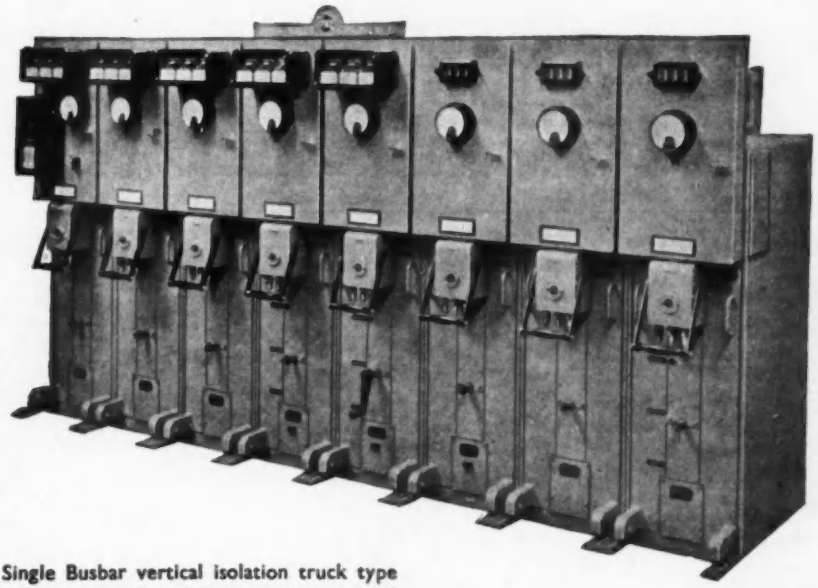

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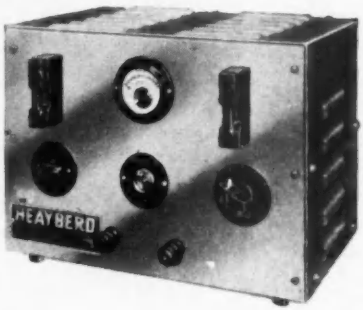

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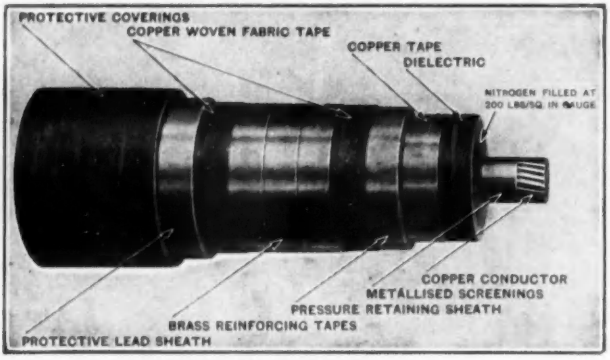

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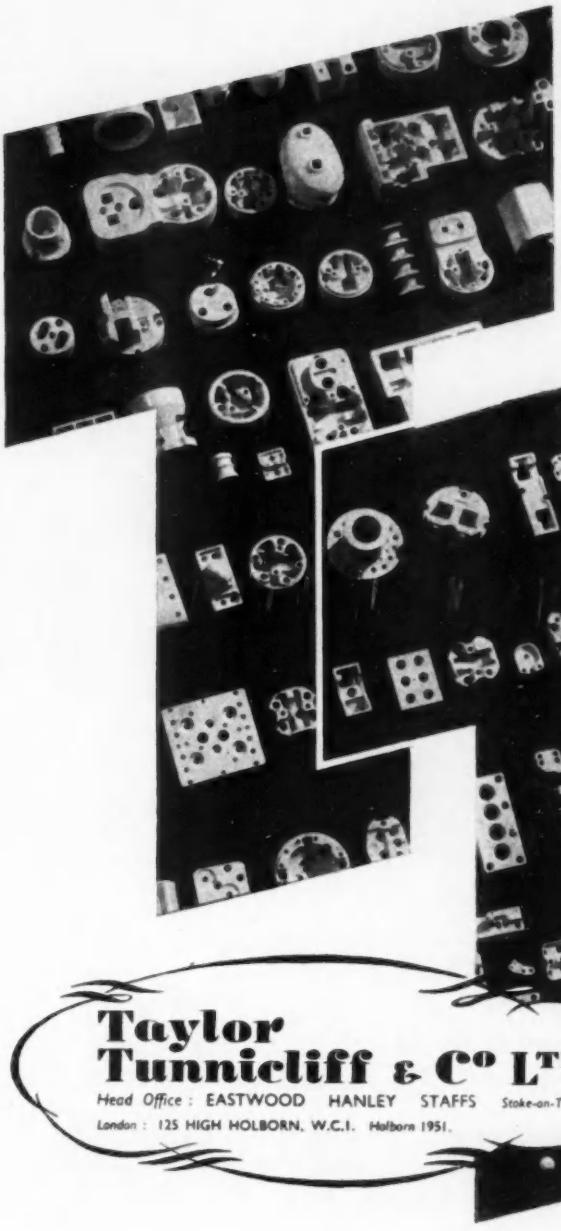

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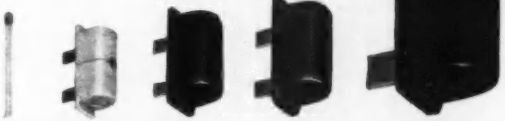

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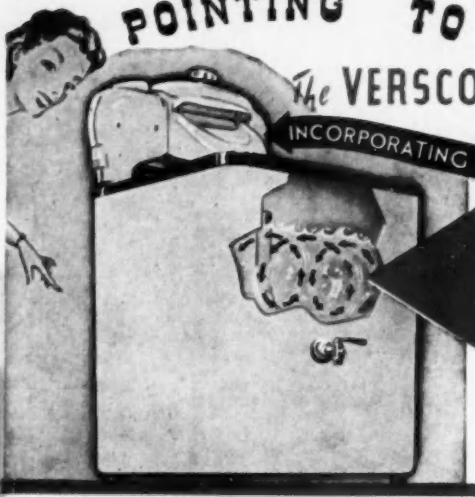

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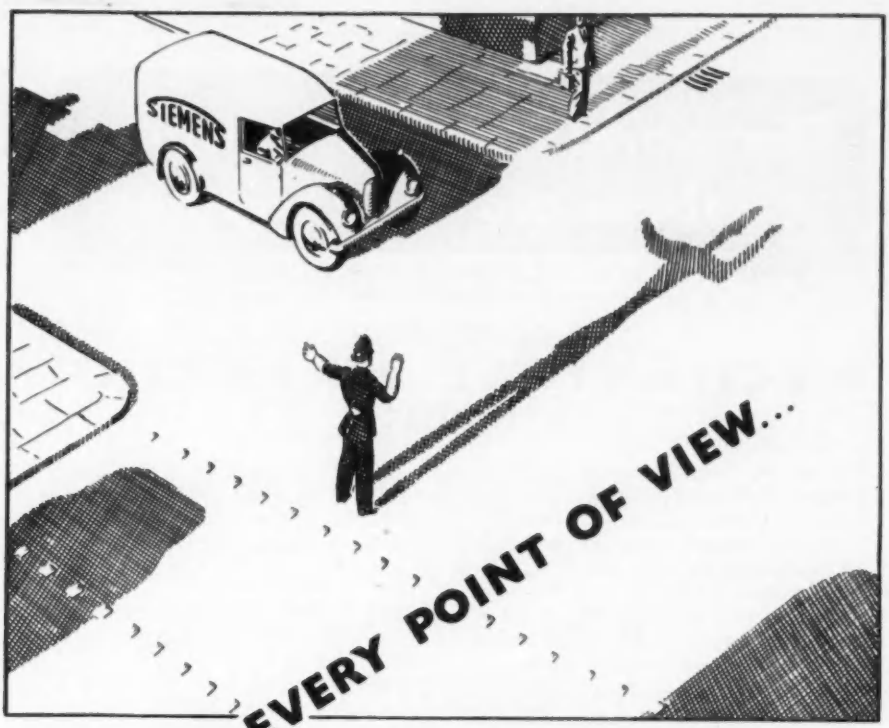

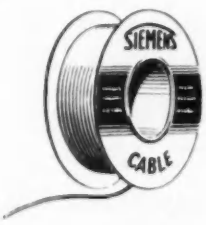

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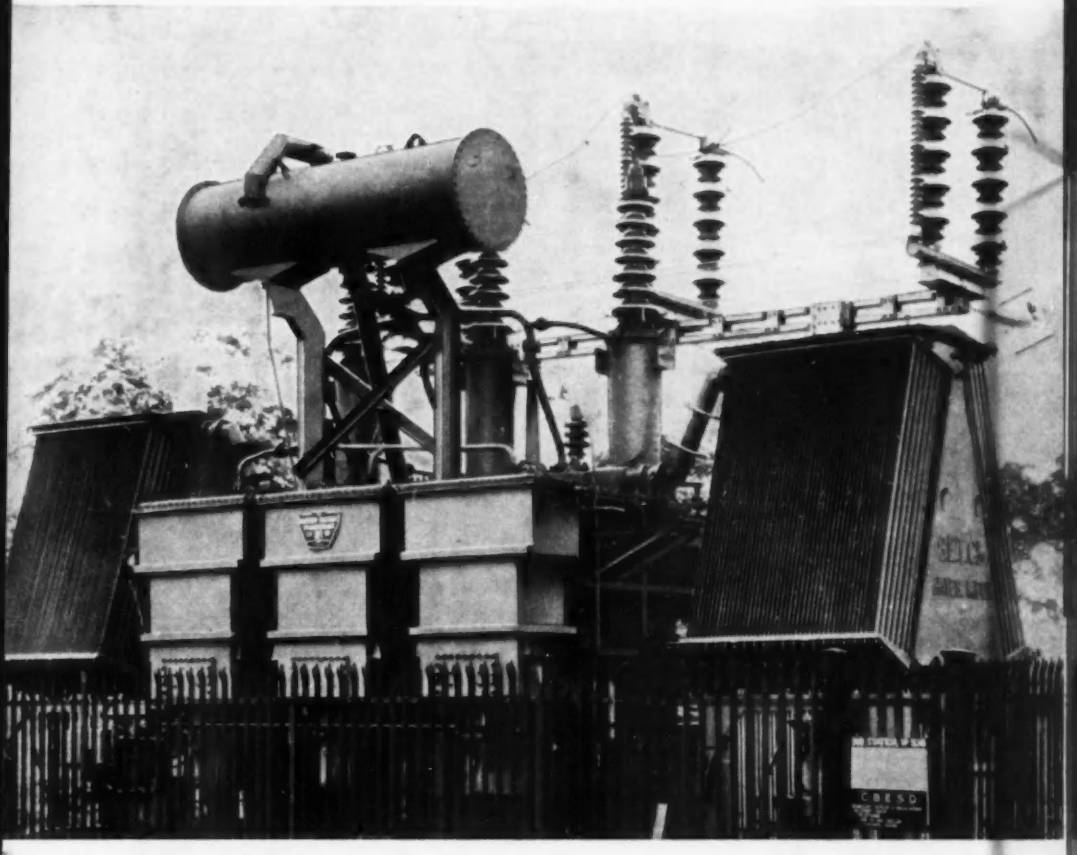

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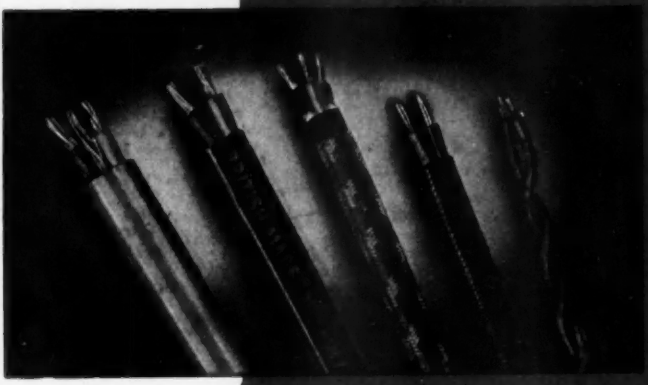

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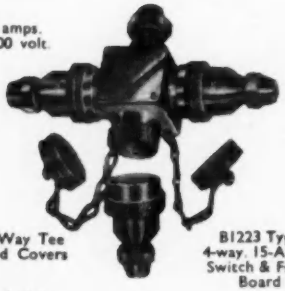

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ELECTRICAL TIMES

Vol. 117 No. 3050 THURSDAY, 20 APRIL, 1950

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FIFTY-NINTH YEAR OF PUBLICATION

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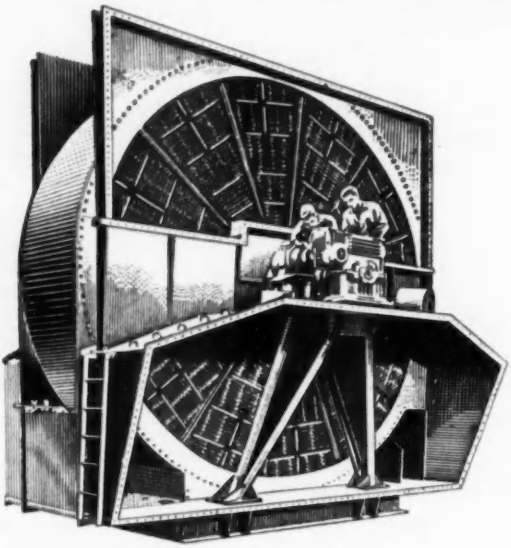

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Editorial

CUE FOR CAPITAL?

AS IT can only be a matter of time before the B.E.A. is forced to float additional stock to finance its large capital programme, a certain piquancy is given to the Stock Exchange rumours last week that the B.E.A. will shortly be raising £150 m on the market. Certainly this sum fits in with the general financial picture, for, from April 1, 1949, to the end of this year, the capital requirements of the supply industry will amount to £180 m, according to the recent White Paper. No doubt a considerable proportion of this can be met from the "spare moneys" referred to in the B.E.A. Report, but when due allowance is made for these, the principal of which is the sum attributed to depreciation, it would seem that at least £100-£125 m of new money will be needed by December. Some of this is already on loan from the Treasury but as borrowing is only a temporary measure, the recent semblance of strength in gilt edge may be the setting for a possible capital flotation. As these notes are being written before the Budget, however, it is impossible to forecast what the state of the market will be in the next few weeks. One thing is reasonably certain; a yield of 3% is a thing of the past and the B.E.A. will have to pay approximately $3\frac{3}{8}$% for new capital dated in accordance with plant life and even this figure may not be possible in a few months time.

HALLMARK

QUALITY is the major selling point for British goods sent overseas, but it is doubtful if the "British Made" mark is always an infallible guarantee of this. There is, therefore, much to recommend the suggestion, made during last week's I.E.E. discussions on B.S.I. and domestic accessories, that the B.S.I. approval mark scheme should be extended and backed by a testing authority, so that the mark itself becomes recognised as a cachet signifying compliance with strict requirements of quality. The organisation needed to operate such a scheme might more than pay its way if it arrived at reciprocal agreements with the corresponding institutions in other countries, and so allowed the approval of British goods under foreign and dominion codes without the long time delay and misunderstanding associated with the sending of samples to and from distant lands, as is necessary in many cases today.

QUALITY IN WORDS

WHETHER standardisation under the British system could, indeed, ensure quality was called into question, but the balance of the discussion seemed to be in the affirmative. It was agreed that quality goods were produced, and no one suggested that manufacturers achieved them without the aid of internal rules and specifications. Since there are many manufacturers for each type of accessory, a considerable saving in overall work could result from the issue of model specifications which could be adapted to the requirements of individual firms. The working out of this idea might help particularly the manufacturer engaged on an essentially mechanical job, who has no technical staff capable of appreciating the reasons underlying requirements of the specifications for finished articles, and whose finished product fits the specification rather than the job. An overall improvement in quality could result, without the accompanying stagnation of design which many feel must result from detailed standardisa-

tion. The drawing-up of such specifications would entail some sacrifice by the more successful manufacturers, but if their co-operation could be obtained the resulting more efficient use of the country's brains would give an overall gain to the industry.

A COOL HEAD

INCREASED output is a common result of the application of electricity in industrial life, but in his lecture to the Institution of Heating and Ventilating Engineers, summarised on page 646, Dr. O'Dwyer gave a new twist to this commonplace. When air conditioning is applied in the tropics, a step involving electrical power, the individual can work more efficiently. Especially can he use his brain to better effect, and since this implies improvements in his exercise of managerial functions, the return from the necessary expenditure may well be enormous. Contemplation of the full possibilities of this offshoot of refrigeration leads us to wonder what application of electricity does indeed produce the greatest increase in P.M.H. An agreed answer is probably hard to reach, but it seems probable that even in temperate climes, electricity contributes as much indirectly by improvements in conditions as it does in its direct task of putting power, heat and other forms of energy just where they are needed.

THE MAINTENANCE PROBLEM

THE point made by Dr. O'Dwyer regarding maintenance of air conditioning equipment is vitally important, since a building constructed for use with air conditioning would soon become untenable if the plant failed, and apparatus which is perfectly satisfactory for the loading conditions needed to cope with temperate countries may have a very short life when operating continuously. This was very noticeable during the war with a similar mechanism—the domestic refrigerator. Many well-known American makes which normally give years of trouble-free service were found to need almost constant attention when installed, as many were, in ambient temperatures of 90°-100° F, resulting in continuous full-load operation. Points which need particular attention are the compressor itself—particularly the valve gear—and the motor, most of which are rated for intermittent running. A further point arises in the drive, for which V-belts seem most popular. Since even the best of these are not everlasting, particularly where the pulley alignment is not all it should be, could not some effort be made to standardise on lengths of belts? Or failing this, designs should incorporate a large range of adjustment. There are few things more infuriating than finding that the only spare belt available within a five-hundred-mile radius is too long or too short.

VARIATIONS ON AN INTERVIEW

THE technique of interviewing applicants for situations is by no means standardised. At one end of the scale is the "Sum 'em up in a glance y'know" type, whose contribution to the interview is mainly confined to a piercing glance and a few brief barks. At the other end are more scientific methods of selection which invoke the aid of "aptitude tests" involving complicated puzzles with bits of coloured wood. Rarely (we hope) can scientific selection go to greater lengths than those scheduled by an American utility for the selection of their sales personnel, their "screening" scheme being divided into four parts. A brief preliminary interview, designed to eliminate those who are obviously unfit, is followed by a questionnaire which considers questions like age, marital status, and possession of savings or investments. Points are awarded for each satisfactory answer, and if the score is favourable, there follows an extensive telephone check-up with previous employers. Survivors now approach Part IV, a jolly little questionnaire containing 177 questions with naive notes for the examiner such as: "Does he live in a desirable neighbourhood?" "In case of divorce, who has the custody of the children—and why?" With such a shining example of scientific selection, our stolid British methods of concentrating on minor details such as knowledge of the job seem dull, unimaginative, and out of date. Or . . . do they?

Meteor

FANS

Ancient & MODERN

A review of the history of the electric domestic fan

HALF a century or more ago, when the uses of electricity were being expanded, our fathers decided that desk fans formed a highly desirable application of the new force. They had already made electric motors of reasonable efficiency and performance, and what could be more natural than to mount blades on the spindle and create a fan. This is practically all the first fans were—small motors with fan-blades on the spindle. Some of these early desk fans had a generic resemblance to present-day fans but, with the common tendency in those early days, field windings were left exposed to the knocks of fortune.

"1/6 H.P. electric fan with wire guard and switch for running fast or slow"
(From the G.E.C. catalogue of 1895)

In 1895 an a.c. fan, driven by a 1/20 h.p. motor, would cost about £9 10s., complete with guard and starting box, and it is interesting to note the instructions which were given by one well-known maker regarding setting up and starting a desk fan.

"The motor should, if possible, be placed on a solid or firm foundation, in order to run noiseless, attention must be given that both bearings are supplied with oil, sufficient to cover the bottom of the rings, and from time to time the bearings should be looked at to see that there is plenty of oil. It is also as well, especially in summer [? *winter*. ED.] to mix with the oil some petroleum that it may lubricate freely.

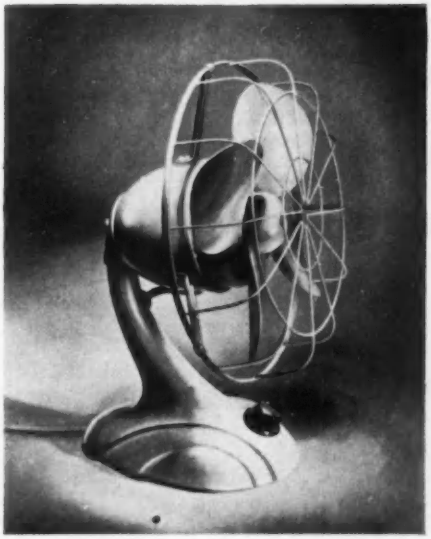
"When it is required to start the motor, after the wires, etc., are all connected, turn the switch found at the base of the motor to the point marked 'Start.' The motor starts immediately, and as soon as it has obtained the normal speed the switch must be turned to 'Load.'

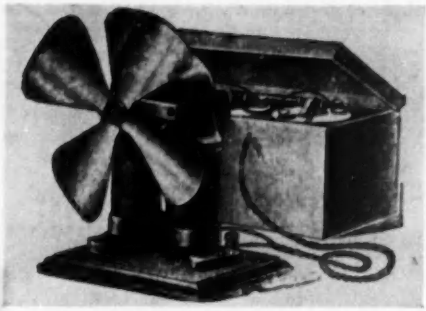
. . . "The motor, when being moved, should always be carried upright, as otherwise the oil is spilt from the bearings."

Fifty years ago supply mains were not so common as today, and those who were far from a public supply ran their desk fans from batteries, after succumbing to powerful sales arguments such as the following.

"They work quite noiseless, and when connected to an Edison Lalande battery they will maintain their power for long periods, requiring little or no attention, and the working cost is very economical." This latter statement is

Below: Modern desk fan (Delco-Remy)



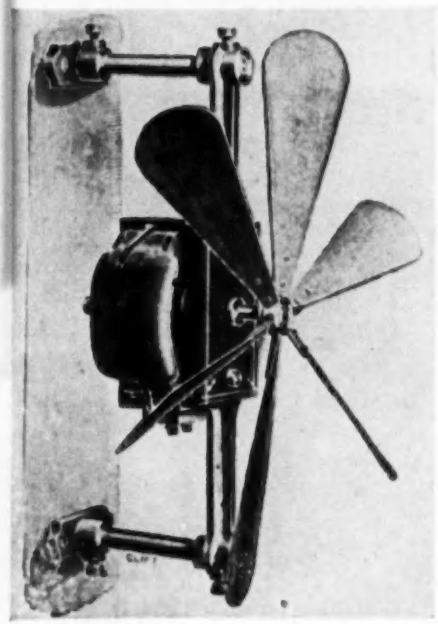


"The Byng Motor with Fan and Grooved Wheel" (G.E.C. Cat. 1895)

a little open to doubt. A battery fan with 9-in. blades cost about £3 10s. and required six Edison (1 V) cells to drive it. In the 300-amp/hr size these cells then cost 12s. each. The renewal costs per cell per charge were, copper oxide plates 1s.; zinc plates 9d., electrolyte 1s. 6d., oil (to prevent evaporation of the electrolyte) 3d., making a total of 21s. for six cells. Now assuming the motor consumed 18 W, there would be a theoretical running life of 100 hours per charge, so the fan cost about 2¼d. per hour to run.

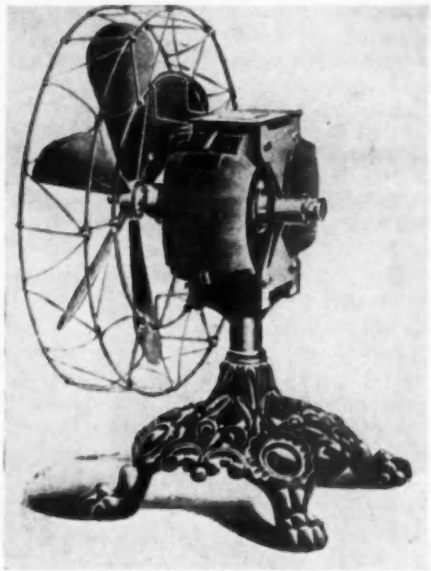
After about 1900 the desk fan became an established piece of electrical equipment. It was

"Alternating motor 1/40 H.P. with bracket attachment" (G.E.C. Cat. 1895)



no longer a motor converted into a fan but was inherently a fan and could not be used for anything else.

In 1902 a d.c. desk fan with 12-in. blades cost about £3 5s., with three-speed regulating switch. An a.c. model was about the same price, but reading between the lines, it seems as if some a.c. machines were not altogether perfect because one firm described its a.c. fans as follows, "These motors, being of the induc-



"Alternating motor 1/40 H.P. on table stand" (G.E.C. Cat. 1895)

tion type, are free from all the troublesome and objectionable features of the wire-wound armature type, with sparking brushes and burnt commutators."

From about 1900 there were no radical changes in fan design, general styling became more modern as the years passed and prices fell, until in 1912 a fan with 12-in blades could be bought for as little as 2 gns, and from a leading firm, too.

Oscillating mechanisms were developed quite early, also "amplifying devices," arrangements of pivoted vertical blades, intended to spread the air stream over a wide angle.

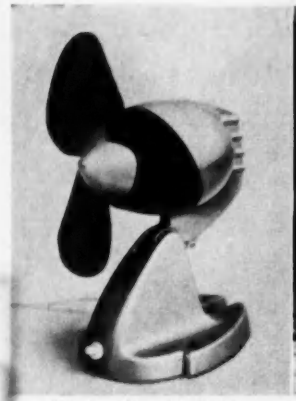
Owing to the excellence of the relatively early designs, the desk fan remained unaltered for many years. Since the war, however, some firms have re-examined the subject and have introduced styles which reflect the more modern outlook in this field.

A GUIDE FOR FAN BUYERS—

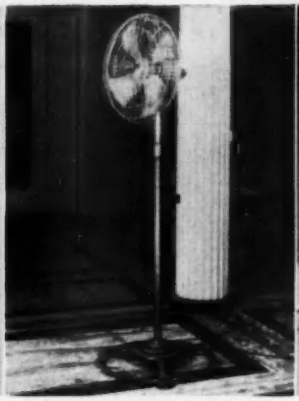
being a survey of home and office fans

Makers	Ref. No.	Type	Motor	Speed r.p.m.	Watts	Blades	Air displacem't cu ft/m.	Special features	Finish	Price incl. P.T.
Aerex, Ltd.	96	Ventilator	A.C.	—	30	—	290	Window fixing	Aluminium, cream or black crackle	£9 15 0
Air Conditioning and Engrg.	"Aircon"	Ventilator	A.C.	1,350	30	3–9½"	420	Window fixing	—	£5 5 0
Aire Electrics, Ltd.		N/O	A.C.	1,100	40	4-12"	500	Adjustable tilt	Black, green or blue, with cream blades	£3 17 6
		N/O	A.C.	1,250	25	4–7½"	270	Synthetic blades; adjustable tilt; on/off switch	Black crinkled enamel	£3 13 6
		N/O	A.C.	1,250	27	4–9"	400			£3 15 0 (all plus P.T.)
Berkeley & Young	O2A quality	N/O	A.C. shaded pole	1,200	50	4–12"	1,100	3 speed and off control, adjustable tilt and swivel	Silver blue	£7 11 0
	O2A Exhaust	N/O	A.C. squirrel cage	1,200	55	4–10"	900	—	White	£5 15 0
J. A. Brooke and Co.	"Tropic"	Ceiling	A.C.	210–70	120	3–56"	12,000	Speed control	White cellulose, gold line banded	£12 (nett trade) with regulator
Delco-Remy-Hyatt	16680	N/O	A.C.shaded pole	1,220	28	4–8"	300	2-speed control available	4 colours	£4 18 9
	19420	N/O	A.C.shaded pole	1,130	32	4–10"	450	—	4 colours	£4 0 0
	17200	Ceiling	A.C.shaded pole	815	37	2–18"		—	Cream	£5 12 6
E.R.Co.	8"	N/O	A.C. 50 cycles	2,500 approx.	20	4–8"		6 ft. flex	Green	£1 17 6
	10"	N/O	A.C. 50 cycles	2,500 approx.	30	4–10"		6 ft. flex	Green	£2 16 3
Falk, Stadelmann and Co.	S93700	N/O	Shaded pole	1,260	33	3–9"	at 4 ft. 500		Green base and gold blades	£4 1 3
	S93701	N/O	Shaded pole	1,330	44	3–12"	1,800		Ditto	£4 13 9
	S93704	Osc.	Shaded pole	1,200		3–12"	1,800	Oscillating gear can be disengaged	Green, with aluminium blades	£8 2 6
Fenton Byrn and Co.	"Air-Flow"	N/O	Shaded pole	1,100	36	4–9"	400	Rubber blades	Cream, blue, green or black	£6 0 0
	69	Window	Shaded pole	1,200	50	6–8½"	340	Aluminium throughout	Phosphated	£10 10 0
	70	Window	Shaded pole	1,200	50	6–8½"	340	As 69, but with translucent baffle plates	Ditto	£12 0 0
	14	Wall inset	Shaded pole	1,300	32	6–6"	115	Flush fitting	Cream grille	£6 6 0
	15	Wall inset	Shaded pole	1,250	43	6–9"	300	Flush fitting		£9 0 0
	17	Wall inset	Capacitor	1,100	48	6–12"	500	Flush fitting		£12 0 0
	23	Wall inset	Capacitor	1,250	60	6–16"	1,000	Flush fitting		£18 0 0 H.D. models extra
H. Frost & Co.	NF950	N/O	Shaded pole	1,300	58	3–9"	at 2 ft. 750	Variable direction, separate wall mounting bracket	Green and silver enamel with mirror finish blades	£4 11 8
	NF1250	N/O	Ditto	1,300	65	3–12"	At 6 ft. 2,400			£5 2 1
	NF1250	Osc.	Ditto	1,300	70	3–12"	At 6 ft. 2,400			£7 16 3
General Electric Co.	*V.1703	N/O	Shaded pole A.C. 230/230 V	2,100	35	3–8"	600	Rubber blades	Silver grey	£4 1 3
	*V.212	N/O	Ditto	1,100	37	4–12"	1,100	3 speeds and off control	Black with O.C. blades and guard	£8 11 3
	*V.137	Osc.	Ditto	1,100	39	4–12"	1,100	3 speed and off control	Ditto, or hammered green or buff	£11 0 0
	*V.129	N/O	Ditto	800	50	4–16"	1,750	3 speed and off control	Black with O.C. blades and guard	£9 17 6
	*V.145	Osc.	Ditto	800	53	4–16"	1,750	3 speed and off control	Ditto or hammered green or buff	£12 5 0
	*V.171	Osc.	Ditto	820	50	4–16"	1,750	Ditto and fulcrum blade with rim	Old gold	£12 16 3
	*V.118	N/O	D.C. 200/240 V	1,200	34	4–12"	1,150	—	Black with O.C. blades and guard	£11 0 0
	*V.134	Osc.	Ditto	1,200	36	4–12"	1,150	—	Ditto	£13 2 6
	*V.126	N/O	Ditto	850	50	4–16"	1,800	—	Ditto	£11 16 3
	*V.142	Osc.	Ditto	860	52	4–16"	1,800	—	Ditto	£14 7 6

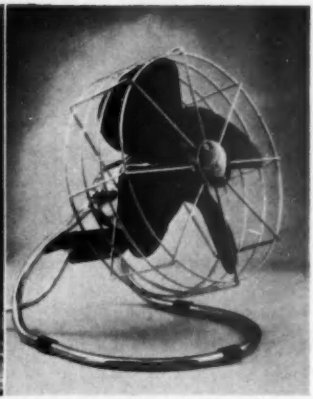
* *Ref. Nos. apply to voltages stated. Others available.*



G.E.C. rubber bladed fan



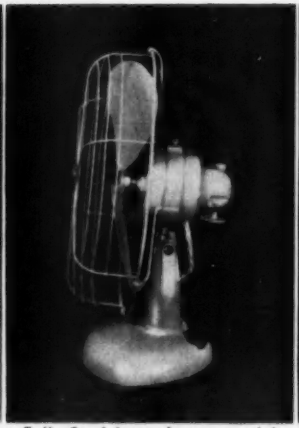
G.E.C. pedestal circulator



Scophony-Baird "Minor"

Makers	Ref. No.	Type	Motor	Speed r.p.m.	Watts	Blades	Air displacem't cu ft/m.	Special features	Finish	Price (incl. P.T.)
Grafton Heater Co.	10"	N/O	Shaded pole	1,200	25	4–10"	250		Grey enamel	£1 17 6
	12"	Osc.	Shaded pole	1,200	30	4–12"	250	Oscillating gear, disengageable	Cream and grey enamel	£3 17 6 (both net trade prices)
Hotpoint E. A. Co.		N/O	Shaded pole A.C. 110/130 V & 200/250 V	1,200	36	4–9"	350	Virtually indestructible rubber blades	Phosphated non-flaking and stove enamelled cream	£6 0 0
Keith Blackman	"Extravent" 6"	N/O	A.C. 200/250 V	1,400	33	4	175	Window fixing, non-warping	Aluminium alloy plain or dark brown	£6 5 0
	"Extravent" 9"	N/O	Ditto	1,300	35	4	308	Ditto	Ditto	£8 10 0
Limit Engrg. Co.	10"	N/O	A.C. only	1,250 –1,000	32	4–10"	480	2 speed control	Chrome and cream enamel	£4 10 7½
	12"	Osc.	A.C. or D.C. only	1,250 –1,000	38	4–12"	750	2 speed control	Ditto	A.C. £8 15 D.C. £10 10
	16"	Osc.	A.C.	1,300 –900 –600	50	4–16"	1,800	3 speed control	Ditto	£13 2 6
Renas Engrg. Co.	"Renas"	A.C.	Induction	1,200	55	4–12"	—	2-speed control	Pastel shades	£4 1 0 (plus P.T.)
	"Renas"	A.C.	Induction	1,200	60	4–16"	—	3-speed control	Pastel shades	£5 5 0 (plus P.T.)

Hotpoint's rubber bladed fan



Falk, Stadelmann's new model

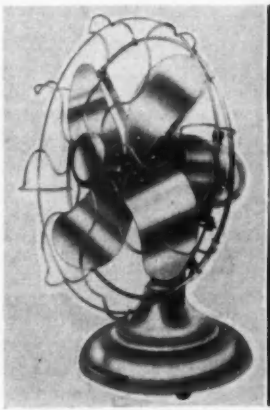
The Revo 8" "Aero"

Delco 18" ceiling fan

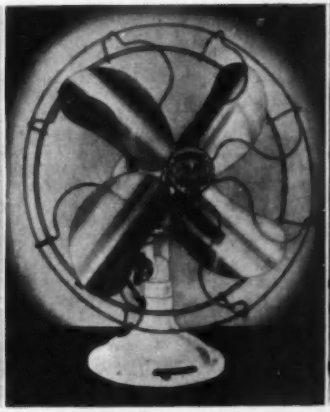
"Aire" desk model

Ceiling fan by J. A. Brooke

Makers	Ref. No.	Type	Motor	Speed r.p.m.	Watts	Blades	Air displacem't cu ft/m.	Special features	Finish	Price (incl. P.T.)
Revo Electric	12295/6	Ceiling	A.C.	320	75/85	2–36"	5,000			
	12297/8	Ceiling	A.C.	200	100/120	3–56"	10,000	D.C. models available	White cellulose enamel	On application
	12299/300	Ceiling	A.C.	190	130/140	3 60"	16,500			
	A13319/21	N/O	Induction	1,850	40	4–8"	450	Adjustable tilt	Cream enamel	£3 5 0
	D5470/2	Osc.	D.C.	1,600	35-40	4–10"	600			£7 3 6
	D5473/5	Osc.	D.C.	1,600	35-45	4–12"	900			£8 11 6
	D5476/8	Osc.	D.C.	1,400	55-65	4–16"	1,500	3-speed regulator	Black enamel	£10 2 6
	A6503/4	Osc.	S.C. Induction	1,350	58	4–10"	570			£7 2 0
	A6505/6	Osc.	Ditto	1,300	60	4–12"	730			£8 4 0
	A7141/2	Osc.	Ditto	1,300	110	4–16"	1,250			£10 5 6
	D5450/2	N/O	D.C.	1,600	25-35	4–10"	600	On/off switch		£4 10 0
	D5453/5	N/O	D.C.	1,600	35-45	4–12"	900	3-speed regulator	Black enamel	£6 12 0
	D5456/8	N/O	D.C.	1,400	55-65	4–16"	1,500			£8 8 6
	A6499/0	N/O	Induction	1,350	58	4–10"	570	On/off switch		£4 9 0
	A6501/2	N/O	Induction	1,300	60	4–12"	730	3-speed regulator		£6 8 0
	A7143/4	N/O	Induction	1,300	110	4–16"	1,250			£9 11 6
										(all plus P.T.)
	A12301/2	Ceiling	A.C.	200	70-80	2–56"	13,000	Condenser incorporated	White cellulose enamel	On app.
	A12303/4	Ceiling	A.C.	200	80-85	2–60"	16,500			
Scophony-Baird	"Minor"	N/O	A.C. 100 V or 230 V	1,400	30	4–7½"	—	Pushbutton switch in base	Chromium and black	£4 8 5
Sextons	"Cool-Breeze" Junior	N/O	A.C.shaded pole	1,300	—	4–7"	—	D.P. on-off switch	Five colours	£3 2 6
	Ditto Senior	N/O	A.C.shaded pole	1,250		4–10"	—	D.P. on-off switch	Green and beige, cream or beige	£4 13 9
Standard & Pochin Bros.	"Win-Flow"	N/O	A.C. 50 cycles	1,350	40	6–7"	350	Window fixing	Stove enamelled on waterised base	£10 10 0

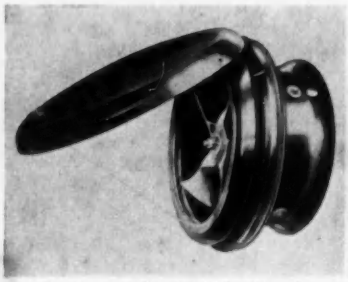


Renas Engineering Co.'s fan

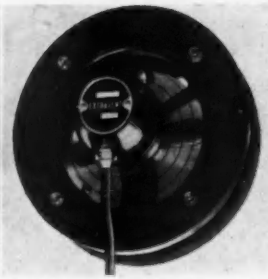


The Limit model

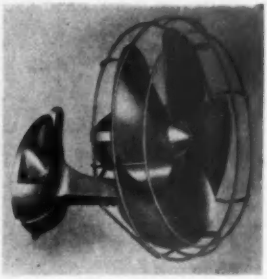
Rubber bladed fan by Fenton, Byrn



Shuttered "Xpelair" by Woods



Keith Blackman's "Extravent"



Wall circulator by Woods

Makers	Ref. No.	Type	Motor	Speed r.p.m.	Watts	Blades	Airdisplacem't cu ft/m.	Special features	Finish	Price (incl. P.T.)
Standard Elec. Engrg. Co.	Stanelect H.	N/O	Shaded pole A.C.	1,100	44	4–10"	—	Adjustable air flow; foldable	Soft French grey and scarlet	£4 13 9
	H.B.12 D	N/O	Ditto	1,100	45	4–12"	—			£5 18 9
		N/O	Ditto	1,100	44	4–10"	—	Adjustable air flow; diecast base	Wrinkled metallic lustre	£5 18 9
	12" Pedestal	Osc.	Ditto	1,100	45	4–12"	—		Cream and grey	£8 2 6
		N/O	S.C.	1,100	45	4–12"	—	Adjustable height	Black crackle	£10 9 4½
Supervents Ltd.	DF/9	N/O	A.C.shaded pole	1,250	23	4–9"	—	Flexible arm mounting; on/off switch	Blue and cream	£4 15 1
	DF/12	N/O	Elec. interference free	1,300	35	4–12"	—	Streamlined tubular base	Bronze and cream	£5 5 4
	AE/1	—	A.C.shaded pole	1,200	25	Multi-vane	180	Window - fixing patent anti back-draught device	Bronze and cream	£6 4 6
Vent Axia	"Silent 6"	—	A.C.	1,150	25	—	140	Window fixing	Moulded plastic casing	£6 6 0
	"Silent 9"	—	A.C.	1,150	35	—	350	Window fixing	Moulded plastic casing	£11 4 0
	"Silent 12"	—	A.C.	—	60	—	700	Window fixing	Moulded plastic casing	£16 16 0 D.C. 15% extra
Veritys, Ltd.	DC2/2	N/O	D.C.	1,400	42	4–12"	1,100		Black/gilt, white/gilt, or white/chrome	
	DC4/2	Osc.	D.C.	1,400	43	4–12"	1,100	Pedestal or bracket fixing	Black/gilt	
	DC6/2	Osc.	D.C.	1,400	42	4–12"	1,100	Ditto	Ditto	
	DC12/2	N/O	D.C.	1,400	42	4–12"	1,100	Ditto	Ditto	
	DC13/2	Ceiling	D.C.	500	45	3–24"	3,750	Shrouded terminals	Ditto	On application
	DC14/2	Ceiling	D.C.	350	55	3–36"	5,000	Ditto	Ditto	
	AC22/2	N/O	A.C.shaded pole	1,400	45	4–12"	1,050	—	Ditto	
	AC24/2	Osc.	Ditto	1,400	45	4–12"	1,050	Safety clutch for osc. movement	Ditto	
	AC25/2	N/O	Ditto	1,400	45	4–12"	1,050	—	Ditto	
	AC28/2	Ceiling	induction	195	88	3–56"	10,000	—	Ditto	
Woods of Colchester	"Xpelair"	—	A.C.		25	Multi	250	Window fixing	Brown	£7 5 3 shutter type: £7 13 0
	Circulator VC31310	N/O	A.C. capacitor		150	4–24"	10,000	Wall mounting, adjustable tilt	Brown crinkle enamel with gilt	£30 0 0
	Circulator	N/O	A.C. capacitor	1,100 –450	150	4–24"	10,000	Adjustable floor pedestal, 4 speeds and off	Chromium and bronze	£37 0 0

KEY:—N/O, non-oscillating; Osc., oscillating.

LIST OF FAN MANUFACTURERS

Aerex Ltd., 46 Rutland Park, Sheffield 10.
Air Conditioning and Engineering (N.I.) Ltd., 104 Chiswick High Road, Chiswick, W.4.
Aire Electrics Ltd., Princes House, 95 Gresham St., E.C.2.
Berkeley and Young Ltd., Tyseley, Birmingham.
J. A. Brooke and Co., Longridge, Pyrford, Woking.
Delco-Remy-Hyatt, 111 Grosvenor Road, S.W.1.
E. R. Co., Elliott Works, Elliott Road, Bromley, Kent.
Falk, Stadelmann and Co. Ltd., 91 Farringdon Road, E.C.1.
Fenton, Byrn and Co. Ltd., Swains Road, S.W.17.
H. Frost and Co. Ltd., Walsall.
General Electric Co. Ltd., Magnet House, Kingsway, W.C.2.
Grafton Heater Co., 133-141 Rosebery Avenue, E.C.1.
Hotpoint Electric Appliance Co. Ltd., Crown House, Aldwych, W.C.2.
Keith Blackman Ltd., Mill Mead Road, Tottenham, N.17.
Limit Engineering Co. Ltd., 15-29 Windsor Street, Essex Road, Islington, N.1.
Renas Engineering Co. Ltd., 107 Albert Road, South Norwood, S.E.25.
Revo Electric Co. Ltd., Tipton, Staffs.
Scophony-Baird Ltd., Penleigh Works, Wells, Somerset.
J. E. Sexton and Co. Ltd., 164 Gray's Inn Road, W.C.1.
Standard & Pochin Bros. Ltd., Evington Valley Rd., Leicester.
Standard Electrical Engineering Co., Stanelect House, Hereage Lane, Leadenhall Street, E.C.3.
Supervents Ltd., Magnare House, Sidcup By-pass, Kent.
Vent-Axia Ltd., 9 Victoria Street, S.W.1.
Veritys Ltd., Aston, Birmingham.
Woods of Colchester Ltd., Colchester.

Our readers' views . . .

Commercial Engineers

THE letter by "B.E.A. and E.P.E.A." in your issue dated 30th March, is unfortunate in tending to embitter further correspondence on this controversial subject. His last sentence, however, indicates that few others will share his view on his ability to judge the issue; in fact, his first three words put the matter more plainly.

There is a difference, however, between consumers' engineers and commercial officers. The former, often enough, have to deal with technical and engineering matters requiring knowledge and responsibility as great as in any other branch of the supply industry. I need only mention the Electricity Acts, including the 1936 Meters Act, Tariffs, the I.E.E. Wiring Regulations, all of which need adequate engineering knowledge for interpretation, to indicate a few aspects of the consumers' engineers' responsibilities. Similar responsibilities exist in connection with development work involved where dealing with industrial, commercial and even domestic consumers.

It should be appreciated that severe competition exists wherever sales of electrical energy are involved, and any engineer engaged on this work has to be able to answer arguments put forward by eminent municipal and consulting engineers, and often by Government officials.

I do not wish to take up valuable space in developing this theme, but will sign this letter, for two reasons, as

ABERDEEN *Bon Accord*

◆ ◆ ◆

Electricity Board Cut Prices

MY old friend, Mr. F. W. Blanshard, the vice-chairman of the Croydon Chamber of Commerce, should have known better, with his long experience, than to have allowed the statement about the South Eastern Electricity Board's electric water heater installation costs, reported on p. 525 of your 30th March issue, to have gone unchallenged. It so happens, a lady I have the great pleasure to know well and who lives not very far away from Croydon, has just had a 3-kW immersion heater fitted in her hot water tank. On my recommendation, she went to an electrical contractor who is well known for high class work. He did a beautiful job and the cost for everything, including lagging the tank, was only just over a pound more than the £18 charged by the South Eastern Electricity Board, which Mr. Blanshard calls price cutting. If one high class electrical contractor can carry on and do a first-class job of work at almost the same cost as the South Eastern Electricity Board, others can surely do the same.

As we grow old changes, drastic changes, come very hard to us. This does not permit any of us to make ungenerous statements, which are factually inaccurate.

My experience so far has been such as to convince me that far from accepting work at cut prices, the young officials are anxious to show a sound margin of profit on the work undertaken. Isolated incidents of price errors are bound to arise, they do in all industries. But let the criticism at least be just and free from extravagance.

WORTHING *Alec Sacré*

◆ ◆ ◆

Battery Operated Welders

I WAS interested to read the account of the use of storage batteries for levelling the peaks on welding processes. This reminds me of the "double L" minesweepers which sent a d.c. pulse through the water in order to release magnetic mines. Of course the duration of the pulse in this case was many times that used in welding (I forget the exact details), and the strength of the current considerably less, possibly little more than 1,000 amp, but when first introduced, accumulators were used to supply the pulse, these being recharged during the rest period by standard generators.

Eventually a special generator was designed to supply the pulse direct, having an intermittent rating and being totally enclosed with forced draught ventilation. This generator was coupled to its prime mover through a fluid coupling which had the effect of evening out the load, and it would be interesting to know whether a similar arrangement, using a suitable 3-phase motor in place of the prime mover, would be successful for some welding purposes.

LIVERPOOL *G. H. Currie*

[The current used in the "LL" sweep was higher than that mentioned by our correspondent, and varied between 2,000-3,000 amps. The non-battery sets used a heavy flywheel to supply the pulse energy, so that what our correspondent suggests is, in effect, an Ilgner type of Ward-Leonard set.—ED.]

Problems and Practice

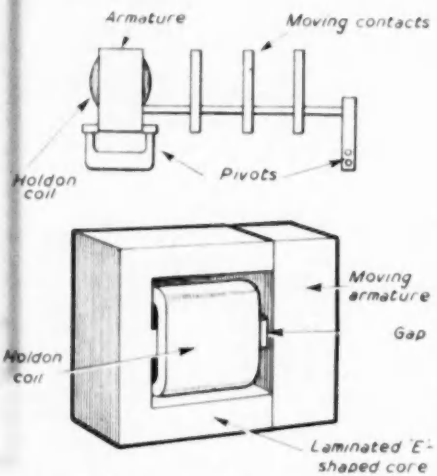
IN ENGINEERING

A Lift Overruns

A TEN-CWT lift cage, with "direct-on" reversing contactors, driven by a 5-h.p., 400-V, 3-phase motor, was continually over shooting the upper level stop limit, and finally tripping the safety limit switch.

The upper limit switch was examined and found in good order and it was then operated from above the lift shaft by a length of string as the cage was travelling up. On operation of the switch the cage did not stop immediately, but travelled a short distance further up before stopping.

At the same time, it was noticed the up contacts did not drop back at the same time as the switch was operated, and so test lamps were placed across the up contactors "hold-on" coil, and the cage sent up, the up limit was operated, *the lights went out*, but the contacts stayed in for a second longer.



The coil and contact arrangement is shown in the upper sketch, with details of the armature below

On examining the contactors, it was noticed the contacts were pulled in by an armature, being attracted to an "E" shaped laminated core around the centre limb of which was the energising coil. On de-energisation the armature and contacts dropped back by virtue of their own weight, as far as the up contactor went, the armature when pulled in touched all three of the limbs, but on checking the down contactor, it was discovered there was a 0·005 in. gap between the armature and the centre limb.

Presumably the extra amount of residual magnetism acting on the "up" armature through the extra contact of iron on the centre limb, held the contacts in long enough for the cage to overshoot both limits. The gap was created again on the up contactor, and the lift has worked normally since.—*L. Pettit.*

Intermittent Supply

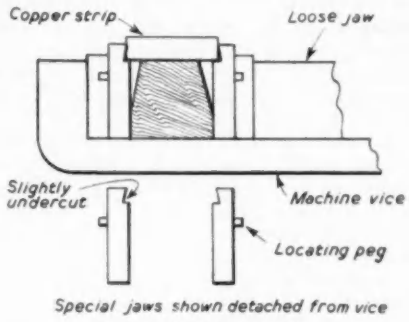
DURING one stormy winter evening I was called out to a fault in a village in our rural area. A farmer had reported that neither his cooker nor three-phase motor would work. The supply at this village was entirely overhead, and this particular farmer was one of the few who had a three-phase motor installed. I suspected that a l.t. fuse had blown at the transformer site, and that other consumers were probably affected. Proceeding to the village, my companion and I noticed that when we approached a pair of roadside cottages on supply, both were lit up, but as we came abreast the cottages the lights in one were abruptly extinguished; we stopped our van to make some enquiry, and as we went through the garden gate, the lights came on again! On investigating, we found that this cottage had an intermittent supply, on for a while, then off for a brief period; the other cottage was unaffected; we noted that the cottage on intermittent supply was connected to red phase, while the other was connected to white. Going on to the transformer site, we found that the red l.t. fuse had blown, while white and blue were intact and giving normal supply. Before replacing the blown fuse we decided that an inspection of the overhead mains was advisable, this we did with the help of a powerful spotlight installed in the van. We quickly discovered the cause of its trouble; a branch of a tree had been torn off by the high wind and was resting on the bare copper conductors of the overhead line. The branch was fractured, but not completely severed from the tree; the weight of the branch being such that it bore the topmost red phase

conductor down into contact with the white phase, which of course had blown a transformer fuse. After the blowing of the red phase fuse the conductor was then energised from the white phase, so that all single-phase consumers were still on supply, but those connected to red were temporarily interrupted each time a gust of wind blew, as the wind was occasionally strong enough to lift the branch sufficiently to free the conductors from contact with each other. Borrowing a ladder and saw we quickly disposed of our trouble and resumed normal supply.—*E. J.*

Drilling Copper

NO liberties can be taken when drilling copper strip for busbars, etc. The rotating drill, on breaking through, grabs the copper, and unless it is well secured, anything can happen. To hold the strip in the usual type of machine vice is the obvious way, but often, if the work is packed up from the bottom of the vice with the object of seeing the centre punch marks, the loose jaw tends to tilt.

To ensure a safe grip, two loose steel plates, stepped as shown, can be made. The amount of use the plates will receive will determine the



Details of vice accessories

quality of steel they are made from. The plates are located in the vice either by means of small screwed pegs, or by lipping, and are prevented from closing in at the bottom by means of a block of hard wood, or fibre.—*F. S.*

Reversed Reading

I WAS instructed to check over the connections of a 3 ph 400 V triple operator welding plant, as when all three welders were operating two ammeters were reading correctly whilst the third was giving a reverse deflection. After a moment's thought, I decided to disregard the instructions and check the interior of the faulty ammeter.

On dismantling, I noticed that the fixed iron had broken off from its base and had fallen to the bottom of the case. Instead of the repelling motion caused by both the moving iron and the

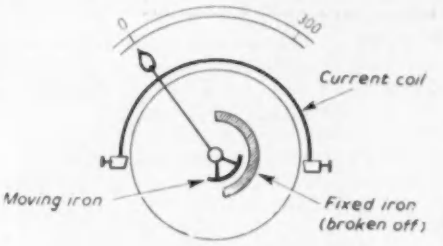


Diagram of meter components

fixed iron being like poles respectively, being minus the fixed iron we were getting an attracting motion between the moving iron whilst situated alone inside the coil and the coil itself. —*W. Adam.*

Radio Danger

A COMPLAINT having been received from a consumer that he had received a shock when poking a coal fire, the installation was inspected and it was ascertained that an American miniature type radio set (110/240 V with resistance lead) had been placed on the metal mantelpiece. The set was supplied by a b.c. adaptor from a switched lampholder. In this type of set, connection is made between the neutral terminal of the set and the metal chassis so that when the adaptor is fixed in the lampholder the phase conductor of the set is connected to the neutral conductor of the supply and the chassis becomes "alive"; this does not, however, affect the operation of the set. The radio set was supported on rubber bushes which are fixed to the base by metal set-screws, which are screwed direct into the chassis. One of the rubber supports having worn down allowed the metal set-screw to come into contact with the metal mantelpiece.

The consumer was poking the fire and, accidentally, touched a gas point, thus completing the direct path to earth and on receiving a shock dropped the poker which fell across the gas pipe, causing the fuses to function.

Evidently a non-reversible socket-outlet should supply such sets, or at least a miniature neon indicator lamp should be fixed in the set to indicate incorrect polarity.—*P. P.*

Notes on Wiring
by MEGOHM

Dangerous Portables

Some Notes on Unsatisfactory Arrangements

FROM casual observation during my various travels up and down the country, the impression that the average person has never heard of the I.E.E. Regulations, and that some manufacturers, who should know better, take advantage of this fact, is daily being confirmed. This particularly applies to the many portable or semi-portable appliances which can be bought across the counter and put into use by the purchaser, without any actual extension to his installation being necessary.

The title, "Regulations for the Electrical Equipment of Buildings," may have misled some designers and fostered the belief that the regulations apply only to equipment used inside a building, but this interpretation is incorrect. It is stated quite clearly in the "Introduction" that they apply to the distribution of electrical energy *in* and *about* all types of dwelling houses, business premises, public buildings and factories, which is explicit enough.

Minimum Requirements

For better or worse, we have standardised our pressure at 240 V to earth, and it is a debatable point at what precise voltage a shock will prove to be without danger to human life. So much depends upon the actual conditions pertaining in each case, but obviously the lower the voltage the less will be the danger, other things being equal. Admittedly low-voltage equipment can be a nuisance due to the heavier cabling required to transmit the same amount of energy, but it is better to play for safety than to risk electrocution for the sake of convenience. It must be remembered that if there is no specific B.S. specification for any particular piece of equipment, then it automatically comes under the provisions set out in B.S.816: "Minimum requirements for electrical appliances and accessories," and this specification, although of necessity somewhat general in character, is quite definite on all essential matters, though in some respects even these might with advantage be elaborated, so as to emphasise the intention underlying the provision.

As an example of this, Clause 8 of the specification dealing with the connection for flexible conductors to portable appliances refers to adequate terminals, cordgrips, and means for avoiding chafing of the conductor at the point of entry, but makes no reference to the type of conductor that should be used. The I.E.E. regulations even might be improved upon in this respect, for although armouring by means of flexible braiding, phosphor-bronze wire, etc., is given as an alternative to tough rubber sheathing where cables are subject to abnormal risk of mechanical damage, it is not made sufficiently clear where the dividing line lies, beyond which some form of armouring becomes necessary.

Dangerous Tools

To enumerate a few specific instances which have come to my notice, I recently came across a small portable grinder used in the streets of Westminster to finish off some iron railings of welded construction, as a preliminary to the necessary painting operations. A t.r.s. cable plugged into a lampholder provided the current at mains voltage, and for earthing purposes a short length of wire was attached to the railings at some convenient spot.

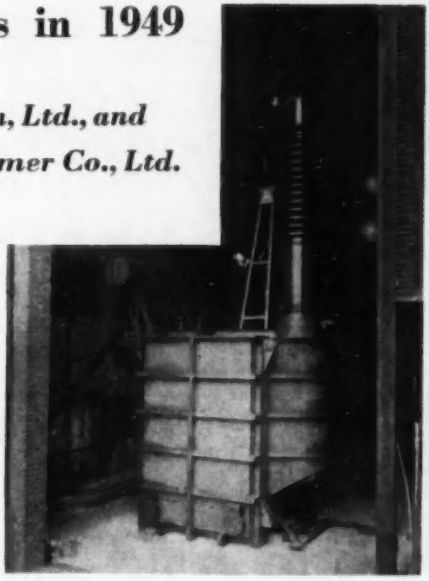
A few yards farther along the street a gang of men working from steel scaffolding were busy washing down the stonework of a building, using a portable motor-driven scrubber-cum-grinder appliance fed from a step-down transformer unit. As the transformer and both the primary and secondary t.r.s. cables were lying in the pools of water formed on the pavement, I could not but wonder at the blind optimism of these people responsible for the arrangement.

Garden Equipment

In the more domestic sphere we are not much better off. Electrically-driven lawn mowers and hedge clippers are now on the market, and seem to me to contain a distinct element of danger when used direct off the mains supply. At a recent exhibition I asked for a demonstration of the latter labour-saving device, but before the vendor could oblige he had to renew, or rather shorten, the t.r.s. flex, as the preceding "prospect" had almost cut it through by getting it entangled in the oscillating knife-blades.

Manufacturing Progress in 1949

No. 11. Crompton Parkinson, Ltd., and The British Electric Transformer Co., Ltd.



A 264 kV experimental single-phase transformer

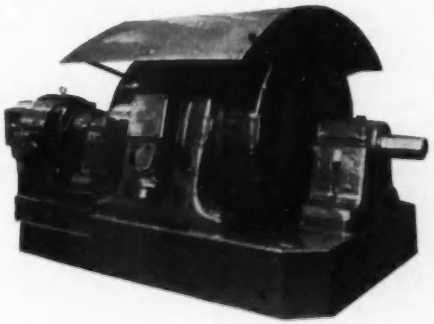
THROUGHOUT 1949 all the works of Crompton Parkinson Ltd. were fully engaged meeting the increasing demand for the company's products. At Chelmsford, the Machine Department has manufactured a record output of alternators up to 1,000 kVA at 6·6 kV, and auto-synchronous, induction and d.c. motors. Several alternators were supplied to manufacturers of generating sets for standby supply. Auto-synchronous motors up to 1,500 h.p. have been dispatched to all parts of the world. One particular order for India comprised six 1,300-h.p. motors. Dollar-earning orders completed at Chelmsford included one for 46 motor-generator sets and nine alternators of a total value of £50,000 for South America.

Traction

Motors have been supplied for the second of two orders received from the Cairo Tramways, and for the tramways in Warsaw and Istanbul. For home use a special design is being used by the London Transport Executive for the new "R" type surface stock. These motors, designed jointly by Crompton Parkinson, Ltd., and the General Electric Co., Ltd., are of the self-ventilated nose-suspended type, with an output of 110 h.p. on the one-hour rating. One special feature is that they are designed without armature core ducts since it has been found from experience that these are liable to become blocked with dirt and impair the ventilation. The speed characteristics are such as will comply with present-day schedules and provide for some increase in the speed for future requirements.

The Traction Division were responsible for the electrical equipment of the four seven-car trains put into service on the Southend Pier Railway during the year. These trains represent the latest practice in light railway engineering; special features are the cardan-shaft motor-drive, the electric braking and the "resilient" wheels incorporating rubber sandwiches to damp out vibration and noise.

The division was also concerned with the modernisation of tramway equipment for the Blackpool Corporation. After 18 months successful service of prototype equipment supplied by Crompton Parkinson Ltd., 18 new equipments were ordered, and the first put into service towards the end of 1949. The new tramcar is a single-deck type with four motors driving through cardan shafts. It has resilient wheels and "Vambac" multi-notch control gear giving high rates of acceleration and braking with complete smoothness. The exceptional performance of this new type of tramcar, sponsored in this country by Crompton Parkinson Ltd., has interested continental tramway operatives and many have visited England to inspect the prototype in operation.



A 3·3 kV, 1,400 h.p. auto-synchronous motor

Improved T.A.P. fuse operated circuit breaker incorporating a new design of fuse rated for a duty of 250 MVA at 11 kV

Trolley-bus equipment has been supplied to the Rotherham Corporation for installation in 18 new single-deck type vehicles which will be used for the fastest trolley-bus schedules in the country. Equipment was also supplied for the new double-deck trolley-buses inaugurated at Glasgow during the year.

A large proportion of the a.c. motor output from the Guiseley Works and the fractional h.p. "Minor" motor output from the Doncaster Works has been supplied to other manufacturers for machine drives. An outstanding order received during the year was for 1,750 motors of up to 10 h.p. for the Hydro-Electric Power Commission of Ontario to be used in areas where frequency is being changed from 25 to 60 cycles. The order was obtained by Crompton Parkinson's Canadian agents, Bepco Canada Ltd., Montreal. It is probably among the largest single order for electric motors ever placed by Canada in either Great Britain or the United States.

Switchgear

The Switchgear Department at Chelmsford have produced large quantities of every type of switchgear covered by the company's range. For various overseas countries, 11kV, 250 MVA, oil circuit-breaker switchgear units have been supplied as complete single and duplicate busbar assemblies. A number of oil circuit-breakers were sent to Canada for incorporation in switchboards to be completed in that country to meet particular requirements. These units are mostly of the 150 MVA class for 6·6 or 11 kV, and the 25 MVA class for 3·3 kV. The latter class has been developed to be very compact; its dimensions are only 1 ft 6 in. by 2 ft by 1 ft 8 in. These results have been achieved by incorporating the SL.100 self-aligning finger contact, which has a high thermal performance, and since it is capable of dealing with short-circuit currents, has enabled the development of a design without special arcing contacts.

Switch Development

Steady development has been made in the design of the Crompton range of switchgear. An improved form of the "T.A.P." fuse-operated circuit-breaker incorporates new types of fuses developed at Chelmsford and subjected to extensive tests in the high-power test station operated by Crompton Parkinson Ltd. As the result of the development of these fuses three models of the "T.A.P." unit are now available with proved fault-power ratings of 100, 150 and 250 MVA respectively. A new spring-closing mechanism developed has powerful clock-type springs. With this type of spring, design is simplified and the closing force required for different switchgear units can be obtained by varying the number of springs in an assembly.

There has been a steady demand for the well-known "Klad" range of switchgear; one single order was for 58 units for the Travancore Rayon Co.

In connection with the testing of switchgear in their high-power station at Chelmsford, the Development and Research Department of Messrs. Crompton Parkinson Ltd., have designed and constructed a "Point-on-wave selector"—an electronic device for initiating the short circuit at any point of the 50 c/s wave within 0·00017 sec. This device provides for a more precise control of the testing condition to ensure maximum severity.

Contracts in Hand

The Contract Department at Chelmsford have been responsible for a number of complete electrification schemes. Of particular interest is a contract in connection with the two thermal stations forming part of the Owen Falls Hydro-Electric Scheme, being carried out under the direction of Messrs. Kennedy and Donkin, London, consulting engineers to the Uganda Electricity Board.

For one station Crompton Parkinson Ltd. are supplying switchgear comprising "DA2A" 11 kV truck-type cubicles as a part of a complete switchboard which includes exciter electronic voltage regulators, field suppression cubicles and auxiliary equipment for the control of the alternators.

The switchgear in the second station will consist of 31 "DA2" 3·3 kV cubicles with auxiliary equipment. Transformers are being supplied by The British Electric Transformer Co., Ltd. (in association with Crompton Parkinson Ltd.) —four 1,200 kVA units for stepping-up to 11 kV, and two 5,000 kVA units for stepping-up to 11 kV and 33 kV.

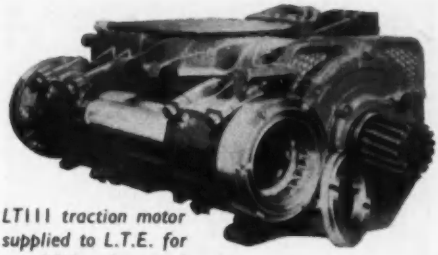
All the main and control cables are of Crompton manufacture. The company is also providing the lighting fittings and lamps for the station.

The Contract Department is responsible for the complete erection and commissioning of the equipment on site.

An interesting contract being carried out is the complete electrification of a chemical factory at Newport, Monmouthshire. This contract involves the supply and installation of 6.6 kV switchgear, cables, several hundred motors, and a complete lighting installation.

Lighting Installations

The Lighting Engineering Department of Crompton Parkinson Ltd., have during the year been responsible for many lighting installations for industry and commerce. Outstanding developments have been made in the technique of shop-window and display lighting using fluorescent lamps, with newly developed forms of fitting. The "Louvalite" type of ceiling lighting has been introduced. This consists of a lattice louvre, forming a "ceiling" which screens fluorescent lamps and results in a diffused and pleasant form of general lighting.



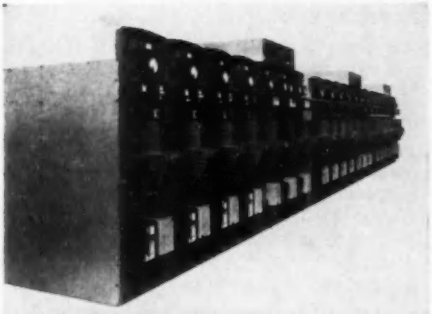
LT111 traction motor supplied to L.T.E. for new "R" surface stock

BRITISH ELECTRIC TRANSFORMER CO.

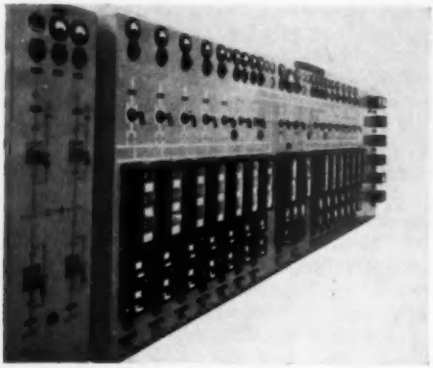
The British Electric Transformer Co., Ltd., continued to experience the steady demand for their products. During the year a variety of transformers up to 45 MVA have been supplied. Every effort has been made to obtain overseas orders and special attention has been given to minimise the delivery times in order to compete successfully with foreign firms. A typical example of an order obtained by being able to quote acceptable delivery time, was the order for 45 transformers for a public supply company in South America. The last 20 transformers of this batch were completed during the year.

Large Transformers

Other overseas orders completed include 13—750 kVA, 11,500/460 V units for Cairo, and large numbers of distribution transformers for Tasmania, Egypt, Burma and European countries.



Left: 3·3 kV MVA oil circuit breaker switchboard for South Africa. Right: 33 kV 150 MVA cubicle type switchgear with solenoid operated oil circuit breakers for a Cairo industrial plant



Above: Switchgear control board for New Zealand. Left: Part of a batch of transformers for South America

A wide range of transformers was supplied for B.E.A. requirements. The largest single unit was a 45 MVA, 132/33 kV transformer for Great Yarmouth. For control of reinforcing feeders in the area of the North Western Electricity Board, the company supplied two 20 MVA quadrature booster equipments for operation at 66/33 kV. A 15-MVA, 10·5/32-kV quadrature booster was also supplied to the same area. All these equipments were fitted with type LS on-load control gear for tap-changing.

For the new Walsall power station of the Midland Electricity Board the company supplied four 5,000 kVA 33/3·3 kV transformers, four 750 kVA 3,300/415 V and two 400 kVA, 3,300/415 V transformers. Other equipment supplied to the Midland Board comprised two 12 MVA 31 5/6·3 kV transformers and a booster regulator with a throughput of 12 MVA, for the Birchills substation. All these units were fitted with B.E.T. type MDA on-load tap-changing gear. This type of tap-changer was developed by the company to avoid the need for frequent maintenance by the incorporation of mercury-switch sparking contacts to relieve the main contacts of the duty of making and breaking current.

Most of the transformers supplied to the B.E.A. with capacities up to 10 MVA were equipped with MDA tap-changers. The units in this category included five 5 MVA transformers, two 6 MVA transformers, and a number of smaller transformers.

Future Orders

Apart from work actually completed there was considerable activity in the construction of units forming part of orders that will be despatched during 1950. One such order is for four 24 MVA, 66/69·3 kV transformers for the B.E.A., one unit of which has already been supplied. Another batch of transformers for the B.E.A. comprises five 6 MVA, 33/11·5 kV units for installation in the South Wales Electricity Board area.

Distribution Transformers

Among the large numbers of distribution transformers either supplied or in production is a batch of 96 250 kVA 11,000/222 V, single-phase transformers for the South Western Electricity Board.

For the B.E.A.'s non-standard distribution system at Hampstead, eight 1,500 kV, 6·6/2 kV, 3/2-phase Scott-connected banks were produced.

Transformers for industrial electrification both at home and overseas were supplied. One particular order comprised two 15 MVA, 66/11·5 kV transformers, fitted with type LS on-load tap-changing gear; and 18 transformers of capacities up to 4 MVA for stepping down from 11 kV to medium voltages.

Three 2,500 kVA voltage regulators were supplied to India, and another 5,000 kVA unit to the New Zealand Government.

Standards for Accessories

Suggestions for B.S.I. in Utilisation Section Discussion

ELECTRICAL accessories for domestic and industrial applications attracted the attention of the I.E.E. Utilisation Section on Thursday last, when MR. J. F. STANLEY, B.SC. (ENG.), M.I.E.E., (B.S.I.), opened a discussion on B.S.I. specifications in relation to these products. He defined the scope of the discussion by quoting the B.S.205 version of electrical accessory, "any device, other than a lighting fitting, associated with the wiring and current-using appliances of an installation." Alternatively there was the "a device rated at below 15 amp" criterion used by manufacturers. Within this range he gave a list of current specifications and noted as in preparation standards dealing with three-phase plugs and sockets for industrial purposes, fluorescent lampholders, and switches and fuse combinations.

In the course of a brief historical survey of B.S.I. progress in the field, Mr. Stanley recalled that at the first meeting of the sectional electrical committee in 1914 it had been pointed out that standardisation must not be allowed to impede progress in design. From this the idea had grown of specifications presenting broad lines of guidance to manufacturers producing a new design.

It was interesting to compare British Standards with those of other countries, and to examine the outlook of those concerned with standardisation. In this country consideration started with the question of how to make the appliance, and what was its performance, etc., to be; on the Continent, however, the idea was more, "Here is an appliance, let us take it to pieces and see how bad it is." In other words, approval testing was the aim. In practice, the results of these two outlooks converged in the process of drafting a standard, and sometimes even passed one another—British and Canadian fuse specifications were an example. There was, incidentally, an interesting line-up of compulsory inspection with countries using extensive timber construction of buildings; protection against fire risk was the major requirement.

An important problem often presented in deciding on standardisation was that of optimum time for introduction. If too early, progress might be impeded; if too late, there were too many forms already in use. The solution appeared to be the devising of an objective standard, to come into force in x years' time. New tools and new designs could then be made to fit in with such a standard, and eventually compliance would be obtained.

Concluding his remarks, Mr. Stanley reviewed the long history of plug and socket standardisation, and finally queried the usefulness of Codes of Practice.

Mr. F. C. FUKE questioned whether specification of performance and safety could guarantee quality. He thought that the only way of obtaining it was for the designer and manufacturer to aim at reliability. Turning to B.S.52 (bayonet lamp-caps, lampholders and lampholder plugs), he suggested that either the plastic shade ring should be excluded, or a separate standard drawn up for plastic lampholders. Dimensions suitable for metal were not always satisfactory with a plastic construction.

With reference to B.S.546 (two-pole and earthing pin plugs and sockets) and B.S.1363 (socket outlet boxes), while he was in favour of shutters, he was worried about the reliability of some now appearing on the market. In all switch specifications there should be a test to check the effect of a straight-through fault current on the closed switch.

MR. J. G. CRAVEN (Green and Smith) put the contractors' point of view, saying that they accepted British Standards in good faith. He noted that out of 28 specifications mentioned by Mr. Stanley, 20 dealt with contacts. He preferred an ounce more pressure in every case to increased contact area. Coming to dimensional standards, he stated that many accessories installed by contractors were lacking in wiring space, especially B.S. 1363 socket outlet boxes.

Safety requirements in B.S. specifications had been very valuable to contractors, an example being the rules to prevent flexibles pulling on terminals. The earthing clamp specification he thought particularly well timed, but he considered that contractors had hardly welcomed 13 amp fuse plugs and sockets with open arms, partly because of the lack of a switch. Porcelain fuse bridges he regarded as a contractor's second nightmare,

and he suggested that distribution fuseboards should be standardised with h.r.c. fuses.

MAJOR R. AMBERTON (Dorman and Smith) emphasised the need to prevent standardisation becoming synonymous with stagnation. There was a danger of this with several of the large users of electricity nationalised and the supply industry all under one control. When new specifications came out it was necessary to make sure that they were not retrograde, and he instanced the fused plug and socket field as a case where this danger had not been averted.

MR. N. ELLIOTT (Factory Inspectorate) considered that engineers should take stock of themselves personally before criticising the B.S.I.; they would often find themselves blameworthy. He suggested a revision of terminology, so that a "non-standard accessory" was one for which there was no appropriate B.S. specification, and a "contra-standard accessory" was one which did not meet the requirements of a relevant specification.

In industry there was a large demand for a plug of the soft rubber type properly standardised by the B.S.I. Other profitable fields of activity would be in reference to adaptors and to connectors for irons. Radio interference suppressors presented a growing problem, particularly when fixed in the flex of portable appliances. Such suppressors were in danger of becoming appliances themselves.

MR. R. H. RAWLL (L.E.B.) spoke on safety requirements, and said that while it was true that the B.S.I. had raised the standard of safety in electrical appliances, it did not follow that because an accessory complied with a B.S. specification it was automatically safe. The human element in using the appliance had always to be considered. It was necessary for those who had wide experience of the use of appliances, periodically to transmit their observations to the appropriate B.S.I. committees.

MR. F. JERVIS SMITH (I.E.E.) intervened in the discussion to emphasise the close relationship existing between the B.S.I. and the I.E.E. Wiring Regulations Committee. The Wiring Regulations Committee looked at regulations as a whole, and in calling for compliance with B.S. specifications the Committee did not abrogate its duty to ensure that safety requirements were kept at a high level.

MR. H. HOBBINS thought that it was possible to specify quality. Manufacturers had to do it in their own works to ensure that good quality articles were sold. The supply industry might well offer to the B.S.I. a "running report" on defects of articles in service, where they would be useful in drawing up new specifications.

DR. F. ROGERS spoke of troubles with brittleness in the brass rings of lampholders, and spoke of a mercury test that could be used by manufacturers to detect this.

MR. W. S. ROBSON thought that dimensional standards were one of the most important kinds, but they could go too far. Interchangeability should be considered in its widest sense, applying to components as well as the whole accessory. Standards of quality might deal with aesthetic value, performance and reliability. The first could not be covered, but the other two qualities could be checked by tests, and more standards specifying such tests were required. In the absence of such standards, manufacturers had to develop their own test specifications, and much waste of effort resulted.

MR. H. W. SWANN (Factory Inspectorate) spoke of the value that would attach to extended use of the B.S.I. mark. He thought that the principle behind it was right, and that the public would buy goods which it covered if sufficient educative work were undertaken. The multiple stores, he thought, would be the first to support such a move. To back up such a scheme a testing and approving authority would be necessary; so far we only had a disapproving authority. There was a need for the mark in export trading, where it would authenticate good quality of manufactures.

MR. E. M. LEE (Belling and Lee) agreed that interference suppressors should not become an accessory, but emphasised that on existing appliances the suppressor must be near the offending appliance. B.S.666 was an interesting example of a standard that had met with international acceptance.

FARM ELECTRIFICATION

MR. C. A. CAMERON BROWN was the lecturer at a London meeting of the Association of Supervising Electrical Engineers, held on Tuesday. Taking "Farm Electrification" as his subject, he gave the present rate of connection as 13,000 farms a year, and envisaged a total of 240,000 farms connected by 1960. Many of the farms so far connected were not yet making full use of electrical power, and there was plenty of scope for wiring and equipping rural installations.

After arguing for the use of single-phase supplies in farms, Mr. Cameron Brown went on to describe the many everyday appliances used, and the attitude of the supply industry to these and some of the farmers' more ambitious plans.

Long-Term Meter Accuracy

The effect of design on service life

by T. Ll. PRICE, A.M.I.E.E.

A SERVICE life as long as 10 or more years between calibrations is not recommended for polyphase kWh meters, but a recent opportunity of examining and testing several hundred meters with a minimum of 10 years' service since calibration led to a number of conclusions regarding the design of such meters. These conclusions should be helpful in deciding the effective service life, between calibrations, of particular types.

To eliminate reference to individual designs of meter, these observations are confined to the conventional two-element "double-decker" type of three-phase three-wire meter, and each detail is common to at least two makes or types of meter.

The general "progress" of a meter error curve with service is the result of two main causes. Firstly, the brake magnet weakens with age, accentuated by any vibration, temperature changes and overloads to which the meter is subject. This magnet weakening causes the meter to over-register in the absence of other changes. Secondly, friction in all moving parts increases with under-registration on light loads and rise of the starting current value.

Brake magnet weakening is greatest during the first few years and may cause meter speed-up of 1% per annum for 2-4 years. After the initial period, changes of ¼% per annum or less are usual. The extent of the initial weakening depends upon the care taken to "age" the magnet before use. There is some evidence that modern magnets are less satisfactory in this respect.

The incidence of friction is less regular and depends upon many features of design and environment during service. Polyphase meter friction errors are greater than in corresponding single-phase types because of the greater rotor weight.

In practice, as the tables show, the friction error determines the useful service life. Full load (magnet weakening) errors of more than 5% are rare, and in general the meter is slow below one-quarter to one-half load. Failure to run on one-twentieth or one-tenth load is not uncommon after long service.

Design Details

The effect of various design details may now be considered:—

Speed. Meters examined had full load (equivalent single-phase) speeds between 20 and 64 r.p.m. The older meters generally had higher speeds than more recent types, and Continental higher than British designs. Meters in the speed range 25-33 r.p.m. gave the most satisfactory results. Above this range full load droop was evident, while slower speed meters had excessive light load errors. This last feature was evident even where the corresponding single-phase meter at 20 r.p.m. is satisfactory.

Bearings. Top bearings of the bushing pattern, with the pin carried on the rotor shaft, gave the best results, provided the pin clearance was small and the alignment accurate. Large pin clearance to cover alignment error leads to chatter and wear.

The bottom bearing is the most important single feature in determining the long-term accuracy. None of the various methods of mounting showed any significant advantage. Design is still largely empirical and subject to many unknown factors. As an example two manufacturers, having produced new types of meter, with a view to standardising components during the changeover period, incorporated their new bottom bearing and pivot assemblies in their old pattern meters, with very poor results in both cases. Yet both new meters and old meters gave normal good performances with the appropriate bearing for which they were designed.

Counting trains. These were mainly of the pointer type. This is one of the parts greatly improved in modern meters. Tooth wear on rotor spindle pinions was considerable, and rotor worm drives gave better results. The common practice of using an eccentric adjustment in the gearing, although it throws two sets of gears out of line, did not result in any detectable increase in wear.

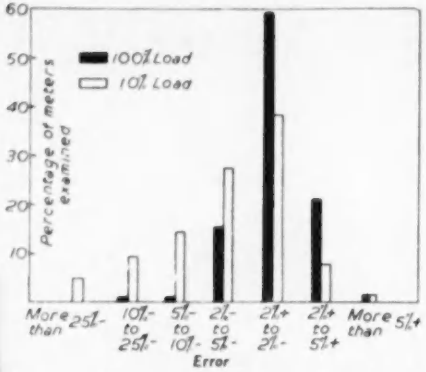


Fig. 1. Distribution of meter errors (see table A)

Other attachments. No completely satisfactory ratchet and pawl device was found. Infrequent power reversal on the circuit results in a sticking pawl. Maximum demand indicators combined with the kWh counter gave most trouble, but all types of m.d.i. worsen meter performance, and require more frequent attention than the plain meter.

Covers and Cases. The pressed steel or aluminium cover was found to be superior in the protection given to the element. This is doubtless due to the better seal provided by the "give" of the cover. For the same reason cover screws are preferred to finger nuts. The very dirty conditions under which many meters were installed proved these points conclusively. Some early Continental meters with pressed cases were outstanding for internal cleanliness.

TABLE A—Percentage of all meters within the limits stated

Meter Error	More than 5%+	Between 5%+ 2%+	Between 2%+ 2%−	Between 2%− 5%−	Between 5%− 10%−	Between 10%− 25%−	More than 25%−
At 100% load... ...	2%	21%	59%	15%	1½%	1½%	—
At 10% load	2%	7½%	38%	27%	14%	9%	4½%

The results of "as found" tests on 200 meters are shown in Tables A and B. These meters were selected out of the total tested as being free from non-typical features to enable a fair comparison to be made. They are of six makes and ten types, and are all plain three-phase three-wire meters, working on 50-cycle h.t. circuits from current and potential transformers.

TABLE B

Overall meter error between 100% and 10% load	Between +2% and −2%	Between +5% and −5%
Percentages of all meters within these limits ...	37½%	72%

Table A shows the distribution of meter errors at 100% and 10% of the *three-phase u.p.f. load*, while Table B gives the overall error between 100% and 10% loads. The crucial role of the light load error in determining the overall error is clearly shown in Fig. 1.

Importance of Light Load Accuracy

The slow speed performance of the polyphase kWh meter deserves more attention. The common three-phase three-wire meter, working as it frequently does on power loads of lagging power factor, runs most of its life at comparatively slow speed. Thus a c.t. and p.t. operated meter, with sufficient margin for o.c.b. full load in the c.t. and with an induction motor load of say 0·8 p.f., will have a maximum speed of about half the nominal (single-phase equivalent) speed, so that a load variation of only 5 to 1 brings the meter speed to the one-tenth load figure.

Polyphase meters are usually measuring supplies of considerable magnitude and cost compared with the single-phase meter and the mere "tacking together" of a number of single-phase elements is not a satisfactory way of designing the polyphase instrument. There seems a clear case for cheapening the single-phase meter and producing a more expensive and accurate design for polyphase power measurement.

Mounting and Wiring

Although not a meter detail, the mounting of meters on industrial and substation h.t. switchgear deserves comment. Too often the metering is clearly an afterthought and is mounted anywhere, without consideration of the need for maintenance or of the fact that the meter dials must be read regularly. Mounting of the meter under the o.c.b. tank, where oil seepage can be expected, was a common fault. Happily the new designs of switchgear, particularly the vertical isolation gear now popular for 3·3-11 kV service, offer much more accessible instrument panels. A matter not improved is the correctness of small wiring. A large switchboard on which all instruments and relays and meters are correctly connected is a rarity. During the testing referred to in these notes, cases of relays and meters wrongly connected on installation and remaining so for 20 years were discovered. On site commissioning and testing is essential, even where the only installation work on small wiring is bus-wiring jumpers between panels.

Accent on Export

The B.E.A.M.A. 39th Annual Report

SOME of the means by which the British electrical industry has achieved its £140 million exports are reviewed in the 39th annual report of the British Electrical and Allied Manufacturers' Association, which is published today. Canada has been priority No. 1 throughout the year, in the work of the Export Department. The U.K. Engineering Mission to Canada is now showing valuable results, while the Standards Mission has reached agreement on a preliminary approval scheme in this country which will considerably ease manufacturers' difficulties. The B.E.A.M.A. Catalogue, to which reference has already been made in these pages, was enthusiastically received in Canada, where a special distribution of 1,200 copies was arranged.

The year ahead, it is pointed out, is likely to be more difficult for the electrical exporter. Advantages accruing from devaluation will be temporary, and offset by rising costs. Competition from Germany and Japan will also have to be reckoned with, and B.E.A.M.A. are making representations to S.C.A.P. for a stricter control over Japanese exports, following reports of "fantastic" price cutting.

Although the official publication of export targets has been discontinued, there will be no relaxation in the drive for increased exports, and the machinery target has been raised to £4 million per month, the Goods and Apparatus being lowered to £1·4 million per month, giving an overall increase of 6% above actual 1949 figures.

It is emphasised that the chief hindrance to the expansion of world trade is not the general level of tariffs but the exchange quotas and import licensing restrictions. South Africa and New Zealand are difficult markets for all except capital goods.

Education

Turning to home affairs, the year's work has included means for raising the standard of technological education; extended facilities for training overseas students and post graduates; the creation of a fund in connection with Cambridge University's appeal for the endowment of Chairs in electrical engineering and heat engines; and negotiations for the deferment of the call up of trainees.

Heavy Plant

The Heavy Electrical Plant Committee had set a target for turbo generator plant of 1,600 MW, but by the end of the year 1,900 MW had been delivered for home and export markets; 1,500 MW has been promised for the B.E.A. in 1950, in addition to the export targets.

The B.E.A. and Area Boards-B.E.A.M.A. Joint Committee has continued to meet regularly. A number of sub-committees have been set up to deal with matters of standardisation, buying terms and contract conditions for various classes of apparatus.

Materials

Close liaison maintained with the British Iron and Steel Federation has brought such encouraging results that the abandonment of the allocation system is envisaged, with the possible exception of sheet steel. Progressive improvements in the h.v. porcelain insulator situation are also expected.

Negotiations with the Federation and with the Sheet Makers' Conference have resulted in improved supplies of better grade hot rolled electrical sheet. New plant being installed by the sheet makers will, it is stated, enable new and better grades of low-loss steel to be produced.

Other Activities

Following representations in conjunction with the Electrical Fair Trading Council, practically all electrical consumer goods were released from price control under S.O's 348, 776 and 2760 (1948).

Counsel's opinion was taken as to B.E.A.M.A's position in regard to the Monopolies Commission, and a reassuring reply was given.

A review of the work of the sections emphasises the difficulties under which domestic cooker manufacturers are suffering due to the policy of retarding the installation of new cookers and the absence of effort on replacement of obsolete models. Heavy duty cooking has been hampered by the continuing restrictions on supplies of materials for orders outside the priority range. Reference is also made to the shortage of home-produced meter jewels.

Interesting points in the review of the work of the technical committees includes proposals for standardisation of tumbler-switch plates and boxes for multiway switches; proposals for the revision of the E.D.A. interchangeability specification for boiling plates; and the preparation of a glossary of terms used in h.f. heating equipment.

The report concludes with a review of activities of allied and kindred Associations.

Air Conditioning and P.M.H.

—increased efficiency follows its use in the tropics

MEDICAL considerations of a more serious nature than the attainment of comfortable conditions must be taken into account when the application of air conditioning techniques to tropical climates is under review. Some aspects of the problem were discussed by Dr. J. J. O'Dwyer, C.B.E., M.B., B.Ch., B.A.O., D.P.H., when he delivered the Napier Shaw Premium lecture to the Institution of Heating and Ventilating Engineers last week.

Dr. O'Dwyer first mentioned the wide range of temperatures and relative humidity values met in the tropics, instancing Delhi (r.h., 10% to 30% in January to April, 73% in August) as an example. Various investigations have shown that men working in a hot and humid climate are lowered in physical and mental efficiency when the effective temperature is between 80° F. and 85° F., that acclimatisation, while increasing performance, will not negative the lowered efficiency due to such an environment, and that it is probable that the effects on performance of such an effective temperature will not vary greatly among Europeans, Africans and Orientals.

Factories

Most factories in the tropics are structurally unsuited to air conditioning, but experience has been obtained in at least one 75,000 cu ft department of a large concern in which air conditioning was a requirement of production. No reduction of temperature is attempted, but the relative humidity is reduced to between 40% and 50%. This reduction has proved a great advantage to both European and African workers, and when the plant nas failed there have been protests that the normal amount of work was impossible. So far as is known, no increase in respiratory disease amongst the Africans has followed this air conditioning.

The building necessary for efficient conditioning was very expensive because of the need for adequate insulation and the concomi ant need to use continuous artificial lighting.

Turning to offices, Dr. O'Dwyer first considered the question of environment, and decided that there is such a fall in efficiency if mental work is done in an effective temperature of 87·5° F. or over that the institution of air conditioning should be sound economics unless the building concerned is very difficult to adapt. With regard to houses, the provision of even one air conditioned room can give a welcome release from the minor irritations of life in the tropics.

The difficulty arising in respect of both office and home installations is that of maintenance. Considerable long-term planning by heating and ventilating engineers will be necessary if an adequate technical staff is to be built up, and it is an open question whether this should be left to individual firms, or a central pool formed by co-operation. Experience has shown that without such maintenance staff the installation of plant is a waste of money.

In considering air conditioning it has to be remembered that hours of work for Europeans in tropical countries are considerably longer than in Great Britain. Much wastage of manpower springs from this great activity and the lack of physical aids to mitigate the discomforts met.

Diseases conveyed by insects, skin diseases, and many other troubles can all be minimised by air conditioning, and this is one of the larger blessings, said Dr. O'Dwyer, that air conditioning can bring to those working and living in the tropics.

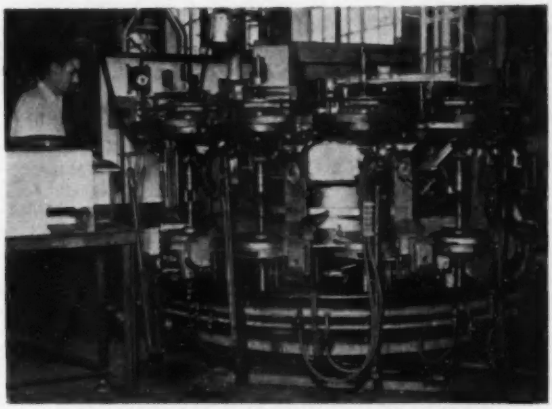
Africans and Orientals

Unfortunately, there is little information available about the effect of a temperate climate on the Oriental or African unaccustomed to it, and so only tentative conclusions can be reached about the effect of air conditioning on such people. Wartime experience with Ghurka troops and Africans showed, however, that when the temperature fell to below 50° F., relatively large numbers of cases of respiratory disease resulted.

On balance, it seems that the danger of ill-effects of air conditioning on the African or Oriental is slight, but an early investigation into the facts of the case should be part of any programme in favour of air conditioning. To this end the co-operation of health authorities in the tropics should be obtained and arrangements made to collect the considerable data that, in the course of time, private industry should be able to provide.

Speeding the production of C.R. Tubes for Television Receivers

New automatic machine at Mullard's Mitcham Works fabricates one tube per minute



The 12-head automatic joining machine showing necks and heads in position

THE word "bottleneck" has nowadays become a catch-phrase to denote a restrictive influence on production, but in the case of television sets, output is limited by the necks not of bottles, but of cathode ray tubes.

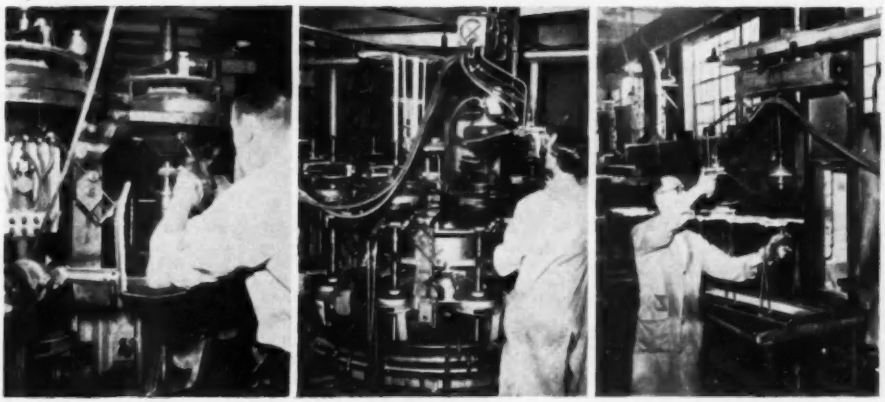
Joining together the necks and heads has formerly been carried out in conventional joining lathes, the output of which does not usually exceed about 30 per day. New automatic machinery recently developed by Mullard Electronic Products, Ltd., is capable of operating at 60 tubes an hour, resulting in a production of 500 per day or up to 1,300 in three shifts. The plant consists of a neck-gauging and glazing machine, in which the glass necks are marked off to the gauged length and one end is glazed to prevent cracks and facilitate joining; a seven-head automatic neck flanging machine; the twelve-head automatic parts joining machine; and an automatically-controlled annealing tunnel or lehr.

Automatic Joining Machine

The automatic joining machine is a development of the conventional type of stem-making and sealing machines, but differs from previous types in that it uses a new system of indexing giving extremely accurate results. The sequence of operation, after loading a neck and a preheated bulb head into the chuck is preheating of the joint for the first six positions. At the seventh a carbon roller forms a flare on the bulb head and the actual joint is made, being annealed at the eighth position. In the ninth the anode seal button is inserted, while final "flaming-off" is accomplished at the 10th and 11th. Position 12 unloads the tube and passes it to the annealing lehr.

The equipment is installed at the Mitcham factory of Mullard Electronic Products Ltd.

Left to right: Anode seal button being inserted: completed bulb being removed from machine: completed bulb being lowered into tray ready for annealing



overseas news

Norwegian Railways

The electrification of the Norwegian railway line to Kongsvinger, about 100 miles north of Fredrikstad, is expected to be completed during the course of this year. It is anticipated that the link-up between the electrified Norwegian and Swedish railways on this line will take place in the summer of 1951, though it is dependant on the date of delivery of the transformer plant for Kongsvinger. This equipment is to be mounted on railway wagons placed inside rock tunnels 40 metres long. It is stated that 40% of the rail traffic in Norway is now electrically operated.

Supply in S. Australia

Progress being made to bring electricity to Yorke Peninsula, South Australia, was outlined recently by the Minister of Lands, addressing the annual conference of the local branches of the Agricultural Bureau. He said that work had already been begun on the first of the two high voltage lines which would link the new Port Augusta power station with the metropolitan network at Northfield. Both lines would run close to Port Pirie, before separating. One would go south via the Hummocks, where it would be tapped to supply Yorke Peninsula. The other, going south-east, would be tapped at Waterloo to supply Upper Murray Valley districts.

Transformers for Brisbane

The Brisbane City Council has placed an order for twenty-four 200 kVA and three 300 kVA transformers with the English Electric Co. Ltd. In addition, the council has ordered 94 transformers from the Rocklea (Brisbane) works of the company. These 94 will comprise 72-200 kVA, 12-300 kVA, 6-500 kVA and 4-1,000 kVA transformers.

Alternators for Tasmania

A contract for three 25,000 kVA alternators for the Trevallyn power scheme of the Hydro-Electric Commission of Tasmania has been placed with R. and C. Thomas Bros., Pty. Ltd. of Melbourne, on behalf of their principals, a Swedish firm. Total value of the contract is estimated at about £250,000. Shipment of the first alternator is scheduled for July, 1953.

Supplies to Pirie Town

The Electricity Trust of South Australia has advised the Port Pirie Town Council that, subject to materials being available when required, it was hoped that the Trust would be able to supply Port Pirie with electricity early next year. Having regard to present rising prices and the difficult position in relation to supply of coal, no indication could be given of the actual charge for bulk supply of electricity, but it would probably not exceed 2d. per unit.

Duty Inquiry

The Australian Minister of Trade and Customs has been asked to clarify the amount of the rate of tariff duty applicable to mechanically-operated meters for recording flow of petrol, oil and other liquids. At present there is no British Preferential tariff, other imports being charged 17½%. U.K. Trade Associations or firms wishing to present evidence at the inquiry which is to be held, should communicate with the Board of Trade, C.R.E.D., Millbank, S.W.1, quoting Ref. No. C.R.E. 4394/50.

Aluminium H.E. Plans

Big hydro-electric developments are being planned in the province of Quebec and British Columbia to enable aluminium manufacturers to operate at full capacity all the year round without interruptions to production arising from water shortages, according to the president of the Aluminium Company of Canada. Present studies in British Columbia, he said, look to the possible future development of an entirely new aluminium industry based on approximately 1,500 million h.p. The company is to increase production at Arvida, Quebec, and plans to develop the hydro-electric power of the Lower Peribonka River, Saguenay district. The Arvida plant will be increased immediately to an ultimate capacity which will mean increasing output to 40 million pounds annually. The Peribonka development depends on the fate of a Bill proposed by Mr. Duplessis, the Provincial Premier, and is now under consideration by the Quebec Government, which would empower the Government to sign a contract with the company for the development of hydro-electric power of that river. If the Bill is passed the company will spend $25 millions to develop 200,000 h.p., by 1953. The projected plant will be situated within 30 miles of the existing Shipshaw development and about ten miles from the Isle Maligne aluminium plant.

Selling in Canada

At the annual three-day spring meeting of the Canadian Electrical Association, concluded in Vancouver a few days ago, the more than 200 members were told by Mr. A. E. Grauer, president of British Columbia Electric, that the industry was facing a transition from a time of scarcity to one of surplus. But the limits of the demand for

household equipment had by no means been plumbed. He urged the salespeople to go ahead with great energy.

A few days later, at the Canadian Association of Radio and Appliance Dealers' Convention in Toronto, Mr. M. Robinson, director of the Association, said the day of door-to-door canvassing to sell electrical appliances was just around the corner. The big problem was the shortage of trained salesmen; the older salesmen who knew the business ten years ago had retired, but there was no labour market to take over, he asserted. With so many good jobs still around, salesmen were unwilling to return to street canvassing, but he considered this means of selling an immediate sales problem. The profit ratio of the sales dollar was far below its 1947 level, he said, because of added inducements to buy through premium and time payments.

Expansion in Alberta

A $30,000,000 expansion and farm electrification programme was announced recently by H. B. Sherman, vice-president and general manager of Calgary Power Ltd. The new programme will extend over five years, lasting until 1954. Work began last year and already some $7,500,000 has been spent. The programme will more than double the company's investment in hydro-electric plants, transmission lines, substations and distribution systems in the province. The larger proportion of this expenditure is in hydro-electric power developments. The present capacity of the company's generating stations is 120,000 h.p. New projects under construction total 100,500 h.p. It is also proposed to construct 400 miles of 138 kV transmission line, 200 miles of 66 kV line, and reconstruct 170 miles of existing line for 66 kV operation. In addition the company proposes to add, through Co-operative Associations, supplies to 3,000 farms per year. By March, 1954, the company will have connected over 18,000 farms.

European Generation

The Economic Co-operation Administration has stated that last year's drought in Southern and Central Europe clearly demonstrated the need for very large amounts of new thermal electrical generating capacity, especially in France and Italy. (Most of the new generating projects financed by the Marshall Plan will be equipped with modern thermal electric generating stations.)

The E.C.A. reported a steady increase in Western Europe's production of electricity since the Marshall Plan began two years ago. At the same time, it pointed out that an adequate supply of electric power was necessary for the economic recovery of Western Europe. Plans of the Marshall Plan countries provided for an increase in generating capacity to 61,071,000 kW by June, 1951, the recovery agency said. It estimated that electric power production figures in 1952-53 would reach 259,126,000 kWh. The 1948-49 production figure was 190,120,000 kWh.

New Station for Portugal

The Portuguese Ministry of Economy has authorised the construction of a new electric power station at the entrance of the Espadanal coal mines, near the town of Rio Mayor.

Greek Plan Approved

The Economic Co-operation Administration last Thursday finally approved the plan of the Greek Government to expand electricity generation. The plan provides for the establishment of a large electricity generating station in Euboea, together with a hydro-electric scheme on the River Ladon, which will serve Thessaly, Central Greece and the Peloponnese. In the second part of the project, a hydro-electric scheme would be constructed at Agra, near Edessa, to serve Macedonia, and Thrace. A further stage provides for a hydro-electric scheme on the River Louros, to serve Epirus. It is estimated that all these stations would contribute 1,100 million units annually.

Restrictions in New Zealand

With continued dry weather, the electric power position in both North and South Islands, New Zealand, has deteriorated rapidly of late. Consequently, the State Hydro-Electric Department has issued a statement to supply authorities and the public that the amount of electric power in use must be reduced. Mr. A. E. Davenport, general manager of the department, has pointed out that during the past weeks, supplies to local authorities were more than 2% above the allocation, and he urged that reductions be made. Unless a heavy rainfall comes soon, more serious restriction may become necessary.

Rising Costs in Cape Town

Rail charges on coal traffic to the Cape Town electricity undertaking have just been increased by 10%. The city electrical engineer, Mr. H. F. Eastman, has said that no increases in charges to domestic consumers are contemplated. Although the higher freight charges on coal would increase the cost of production of electricity by £34,000 in 1950, it was expected that £34,000 would be saved on the cost of coal consumed in the year, he said, because of improvement in the quality and grading of coal coming forward in recent months. This better quality coal resulted in increased operating efficiency at the power stations. With the improvement in coal the £18,137 which appeared in the 1950 municipal estimates as a contribution to rates from electricity would not now be affected, although the sum for the relief of rates might have been more than £52,000 this year if there had been no increase in coal freight charges.

PERSONALITIES

IN THE INDUSTRY

After completing 43 years' service in the Electrical Department at the No. 1 Steel Works of John Summers and Sons, Hawarden Bridge, **Mr. T. Catherall** retired recently, and was presented with an electric clock and other gifts subscribed for by the staff. The presentation was made by **Mr. S. A. Lewitt,** chief electrical engineer.

Mr. A. J. Grover, of Spalding, Lincs., district engineer to East Midlands Electricity Board, has resigned to take over a concrete specialist business at Donington, Lincs. He was appointed assistant electrical engineer to Spalding U.D.C. undertaking in 1931, when he went to Spalding from West Ham, and he has held his present post since vesting day.

The term of appointment of **Mr. G. S. Boyd,** A.M.I.E.Aust., general manager of Sydney County Council electricity undertaking, New South Wales, has been extended to August 24, 1950.

After more than 50 years' service each with the firm, two officials of the Sunderland Forge and Engineering Co., Ltd., Sunderland, have retired. They are **Mr. E. Aird,** works manager of the electrical department for 22 years, and **Mr. J. J. Rutter,** manager of the switchboard department. Mr. Aird's successor is his former assistant, **Mr. G. W. Keith.**

Birmingham area representative of Gent and Co., Ltd., **Mr. S. F. Herne,** recently completed 50 years' unbroken service with the firm. To commemorate the occasion he was presented with a cheque at an informal ceremony, at which our photograph below was taken. Left to right in the group are: **Mr. O. E. Kinsey,** director and secretary; **Mr. S. F. Herne, Mr. H. Waddington,** director; **Mr. Kelvin Parsons,** managing director; and **Mr. R. Swift,** works director.

Mr. K. Parsons, making the presentation to Mr. Herne

With the concurrence of the British Transport Commission, the Railway Executive has appointed **Mr. H. H. Swift,** B.E., M.I.E.E., as executive officer (electrical engineering, new works and development) at R.E. Headquarters. Since nationalisation in 1948, he has been acting electrical engineer, Eastern and North-Eastern Regions, British Railways. Prior to that he was with the L.N.E.R., from 1936 as assistant electrical engineer, and from 1941 assistant chief electrical engineer. His early experience was gained with Siemens Schuckert, and at the Dick Kerr Works of the English Electric Co. For the latter company he went to Japan in 1922 to handle electric traction work there, and in 1926 became resident engineer in South Africa to the E.E. Co., in charge of rolling stock for the electrification of the Cape Town-Simonstown line. In 1930 he was appointed chief assistant to the manager and chief engineer of the E.E. Co's traction department, and four years later was made assistant manager of the department.

Mr. H. H. Swift

At the annual meeting of the Dumfries and Galloway Electrical Society, **Mr. E. M. Grant** was elected President, and **Mr. Stewart Money** vice-president.

On his retirement after fifteen years on the technical staff of the Cornwall Electric Power Co. and the South Western Electricity Board, **Mr. C. C. Scott** was recently presented with a cheque by **Mr. A. C. Owen,** Cornwall sub-area manager, on behalf of his colleagues.

The National Coal Board has appointed **Dr. J. Bronowski** as director of their Central Research Estab-

lishment at Stoke Orchard, near Cheltenham. At present, he is assistant chief scientific adviser at the Ministry of Works. He takes up his new duties on May 22, and will be directly responsible to **Dr. W. Idris Jones,** Director-General of Research at the Board's headquarters.

For many years chief works accountant to the English Electric Co. Ltd. **Mr. J. P. McMurray** was recently presented with a gold watch and a wallet on his retirement.

Power station superintendent at Brighton generating station since 1946, **Mr. L. A. E. Fosbrooke,** B.SC., A.M.I.E.E., has now been selected for the post of generation engineer (operation) to the Midlands Division of the B.E.A.

Mr. F. Horler, signal engineer with Siemens and General Electric Railway Signal Co. Ltd., has been elected president of the Institution of Railway Signal Engineers for the ensuing year.

Public lighting superintendent at Aberdeen, **Mr. R. Parker,** was elected chairman for the ensuing year of the Scottish section of the Association of Public Lighting Engineers at the spring meeting of the Association, held in Paisley on Wednesday of last week.

Formerly senior executive officer at Tavistock to the South Western Electricity Board, **Mr. H. W. Knapp,** has now retired, after completing 50 years' service in the industry. Prior to vesting day, he was general manager of the West Devon Electric Supply Co. Ltd. Another of the Board's long-service employees, **Mr. A. E. Baker,** M.I.E.E., was recently presented with an electric clock and long service certificate, by **Mr. H. Midgley,** deputy chairman of the Board, on his retirement after 40 years in the supply industry. He also received a bookcase from **Mr. W. E. Johnson,** mains engineer, on behalf of the staff. Mr. Baker was the Board's branch manager at Paignton, having been engineer and manager to the Paignton Electric Light & Power Co. prior to vesting day. He is succeeded by **Mr. S. J. Swain,** formerly of Brixham.

Left to right: Mr. W. E. Johnson, Mr. H. Midgley, Mrs. Baker and Mr. A. E. Baker at the Paignton ceremony

Recently appointed chief development and process engineer to Aberdare Cables Ltd., is **Mr. K. R. Brooker,** A.M.I.E.E., who, for the past ten years, has been cable designs and specifications engineer at the Erith factory of British Insulated Callender's Cables Ltd. Trained at Erith Technical College and Woolwich Polytechnic, he joined the Erith works of the old Callender's Cable Co., and after the merger with B.I., held various positions both in the technical and production organisations of the company. In his early days, he specialised on dry-core telephone cable, but more recently he has devoted his attention to all types of power cables up to 264 kV. He represented B.I.C.C. on several C.M.A. Technical Committees.

Mr. K. R. Brooker

Mr. D. N. Dale, formerly with the publicity department of the Hotpoint Electric Appliance Co., and the International Refrigerator Co. Ltd., has this week taken up duties as publicity manager of the Simplex Electric Co. Ltd. He is the son of Mr. V. W. Dale, general manager and secretary of E.D.A.

Mr. D. N. Dale

Mr. E. G. O. Ridgwell, of the General Electric Co. Ltd., has been elected to the Council of the Institute of Packaging.

We have been asked to make it clear that **Mr. E. S. Booth's** appointment as engineer in charge of the co-ordination section of the Generation Construction Department, noted in our April 6 issue, is at the headquarters of the B.E.A., and not of the N.W. Division.

Mr. I. A. Marriott, managing director of W. G. Bagnall Ltd., has been appointed director of Parsons Engineering Co., Ltd., of which he was already a director, in place of **Mr. Harry Parsons,** J.P., who will continue as chairman.

On his retirement a short time ago, **Mr. J. H. Wears,** O.B.E., works manager of the English Electric Co.'s armoured vehicle and welding department, was presented with a car radio set on behalf of his colleagues. He originally joined the firm in 1928 as superintendent of the switchgear department, and

became chief superintendent, Stafford Works, in 1934.

OBITUARY

It is with regret that we record the death, on April 15, of **Mr. G. J. Hollyer**, M.I.E.E., who had been manager of the Torquay and West Devon sub-area of the South Western Electricity Board.

Mr. G. J. Hollyer

A Londoner, Mr. Hollyer was educated at the North London Collegiate School and technically trained at the Polytechnic. After serving an apprenticeship with a London firm of electrical and mechanical engineers, he joined the Walthamstow electricity undertaking in 1905 as engineer-in-charge. He stayed at Walthamstow till 1927, attaining the position of chief assistant engineer, going to Loughborough in April of that year, as borough electrical engineer and manager. In December, 1929, he took up the position of borough electrical engineer and manager at Torquay. Mr. Hollyer was due to retire at the end of June next. Under the reorganisation of the South Western Board's area, the Torquay, Exeter and Taunton sub-areas are being merged (as noted in our April 6 issue). Of late, Mr. Hollyer had been on administrative work in connection with this change.

His many friends in the industry will learn with regret of the death on March 26, of **Mr. W. Milne**, for a number of years an executive of British Driver-Harris and Co., Ltd., He joined the staff of that firm during the first world war, and in 1923 became sales director, a position he held for 25 years. In 1946 he was elected a director of the company. Mr. Milne, probably the most widely travelled member of the British Driver-Harris organisation, retired from the board of the company in September, 1948.

The death occurred on April 11, of **Lt.-Col. Hugh Wood**, assistant managing director of Hugh Wood and Co.

We note the death, on April 10, of **Mr. W. A. Lowndes**, aged 53, chief designer and head of the drawing office of Whipp and Bourne, Ltd., He started his career with Metropolitan-Vickers Electrical Co., Ltd., later going to Ferguson Pailin, Ltd., before joining Whipp and Bourne in 1920 as a designer. He had been chief designer and in charge of the drawing office since 1933.

We note the death, on April 4, of **Mr. Walter E. Poor**, aged 64, chairman of Sylvania Electric Products Inc., U.S.A.

The death occurred recently of **Mr. C. E. Hart**, aged 75, director of Exide Batteries (Ireland) Ltd., and of Battery Makers (Ireland) Ltd. He joined the Chloride Electrical Storage Co. in 1906, representing the firm in Scotland, Ireland and the North of England until 1919, when the increasing business in Ireland required his full time and caused him to settle there. He was a past president of the Electrical and Allied Trades Golf Association.

The death occurred on April 17 of **Mr. F. T. De Monte**, C.B.E., late chief engineer of India Posts and Telegraphs.

BRITISH STANDARDS

Trailing Cables for Mining Purposes. *B.S. 708: 1950. Price 3s.*—This is the second revision of B.S. 708, and apart from changes in the types of construction covered, the principal differences from the former edition concern the admission of spark testing, the requirement that the outer tough rubber sheath be fire-resisting, and the introduction of a definite colour scheme for core identification.

The standard is now in four parts, dealing respectively with trailing cables for coal cutters, conveyors and loaders, drills, and for use in remote control circuits. Constructional details are specified for the standard types of cables, including dimensions of conductors, requirements for protective screens and insulation; the overall dimensions of the cables and fire resistance are also specified. The standard includes tests for thickness of insulating material and rubber sheathing; for over-voltage and insulation resistance, on the core and the finished cable; for tinning of copper wires, for galvanised coatings on armour wire, and for the resistance of cable to flame.

Open-Type Condensing Units for Refrigeration. *B.S. 1586: 1949. Price 3s.*—Methods of rating and testing these units are discussed in this standard, which is complementary to B.S. 1608: 1949. It is limited to units using CCl_2F_2, CH_3Cl or SO_2 as a refrigerant. After defining certain terms, the specification lays down the instruments to be used and the results to be recorded, and then describes the test procedure and necessary calculations in detail.

Condensing Units for Refrigeration. *B.S. 1608: 1949. Price 2s.*—Rating, test requirements, minimum equipment and motor loading of air and water cooled condensing units using CCl_2F_2, CH_3Cl or SO_2 as refrigerants are covered in this standard. In particular construction, pressure testing and marking are dealt with, detailed testing being mentioned only by reference to B.S. 1586: 1949. Appendices detail standard flanges, flare nuts and unions.

British Standards reviewed above can be obtained from the B.S.I., 24 Victoria Street, London S.W.1, post free at the prices given.

Sketches by Wire

New Muirhead Equipment for Direct Facsimile Transmission

FOUR years after the release of the Muirhead-Jarvis picture telegraph equipment, Muirhead and Co., Ltd., have placed on the market a direct recording fascimile apparatus, under the registered trade mark "Mufax." An impregnated paper is used which is sensitive to the passage of an electric current and at the receiver this is run between a rotating helix and a thin straight edge, the transmitted voltage being applied between these two components. The paper darkens proportionately with the current, and so a half tone picture effect is obtained. For the transmitter, any normal type of photoelectric apparatus conforming to C.C.I.T. standards may be used. The handwidth required is only 2 kc/s, and so transmission may be carried out over normal telephone circuits.

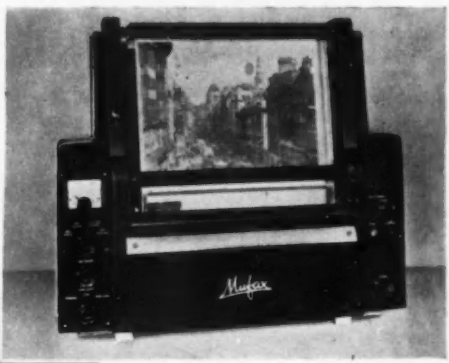
There are two main fields of application for this Mufax system, the first concerned with newspaper working and the second with everyday business activities. In the newspaper office, the Mufax receiver provides a useful monitor for the standard types of wired photograph receiver.

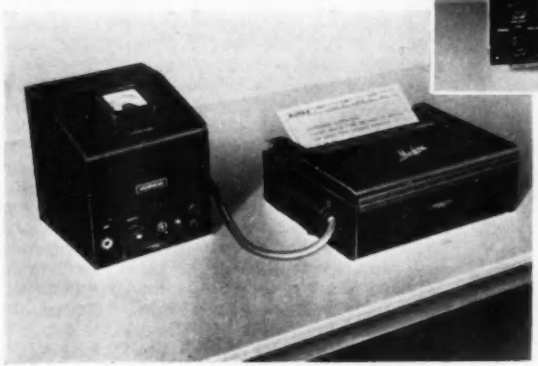
In addition to this monitoring duty, the Mufax apparatus gives a relatively cheap method of picture transmission and reception where only low resolution is required, as is the case when coarse-screen blocks are used. Definition and tone value is quite sufficient for blocks to be made directly from the Mufax prints. For this purpose a small 21 in. x 16 in. x 7 in. transmitter has been developed, fitted with a 66 mm diameter drum taping prints up to 7⅞ in. x 8 in. This equipment costs £650, while the large receiver (88 mm drum) is priced at £725 with controls or £625 purely as a monitor, and the small monitor, for wire room use, £525.

Business Applications

A development of the full picture telegraphy apparatus is the system for the transmission of telegrams and sketches, which is suitable for use between offices and works of an industrial organisation. Although the principle of operation closely resembles that of the full photographic apparatus described above, there is the difference that tone value is of no importance against speed combined with legibility.

The equipment is designed for a.c. mains operation, and is dependent upon connection to a common supply to provide synchronism between the transmitter and the receiver. There is an automatic initial phasing adjustment, which is completed in about seven seconds, and then the continuous roll of sensitive paper runs through at about 2-4 in/min.





The large picture receiver suitable for newspaper offices is shown above, while to the left is the small receiver used in telegram and sketch transmission

The BUYER'S *Column*

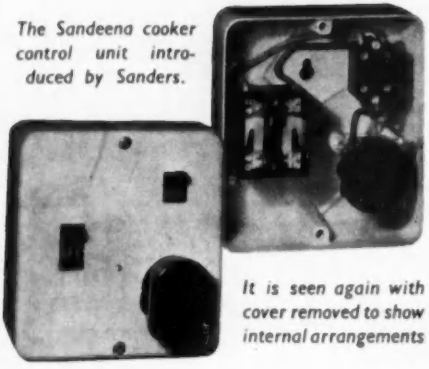
Sanders introduces the "Sandeena"

A SOUNDLY designed cooker control unit which although standardised in size and rating, i.e. 30 amps 250 V single ph. a.c., has been produced as an individual unit and has received the care and attention in design and manufacture for which the makers are renowned. This is the "Sandeena" just introduced by WM. SANDERS AND CO. (WEDNESBURY) LTD. of Falcon Electrical Works, Wednesbury, Staffordshire.

The neat pressure die cast aluminium case houses a 30 amp and a 15 amp d.p. a.c. switch which has been introduced only after extensive testing and research. One test involved 25,000 "full load" and 100,000 "off load" operations. The 13 amp socket and fused plug conforms with B.S. 1363 except that it is fitted with a circular cover. This does not however effect interchangeability or performance. The case itself has an attractive and durable bonded finish of cream stove enamel. The lid has a protective internal flange and is secured by two chromium plated raised countersunk screws. Three cable entries and exits—one at the back and two at the bottom—provide entries for 1 in. conduit when the sealed closures are knocked out.

All internal fittings are mounted on raised drilled and tapped pillars cast into the case and are connected in C.M.A. grade v.i.r. cable. Internal lettering leaves no doubt concerning the positions for incoming and outgoing cables, whilst earthing terminals built into the case provide neat earthing arrangements either inside or externally. These many features, coupled with a modern design, should make this unit a fast-selling proposition.

List number of the "Sandeena" is C.3313, and the list price is 14s. plus 110% subject to trade discount.



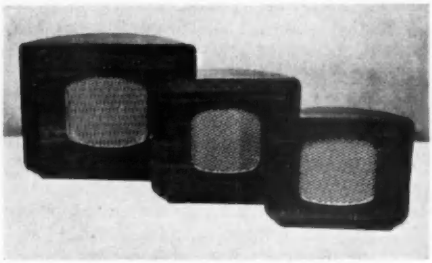
The Sandeena cooker control unit introduced by Sanders.

It is seen again with cover removed to show internal arrangements

The "Bafflette" Family Sound Better

UNORTHODOX design typifies the latest extension speakers being marketed by RICHARD ALLAN RADIO LTD. of Caledonia Road, Batley, Yorkshire. The three members of the new range are the "Baby" Bafflette, the "Minor" and the "Major." Prices include "out of sight" volume control and are as follows: 39s. 6d., 52s. 6d. and 65s. respectively. Dimensions again respectively are: 9¾ in. × 7¾ in. × 3½ in., 11 in. × 9¼ in. × 3¾ in., 14 in. × 11½ in. × 5 in. Transformers are extra.

As can be seen in the photographs the design is unique; the same lines are followed in each model and an attractive effect of a bow-shaped baffle is created by all corners being rounded. No sides are used, but the shaped front gives an effect of depth and permits an "out of sight" volume control to be fitted. Top and bottom are bowed to reduce resonance to a minimum and to add to the elegant appearance of the French or Australian walnut veneer which is used in the construction of the baffle.



The three members of the Bafflette family

Signal Lamp Fitting by Bulgin

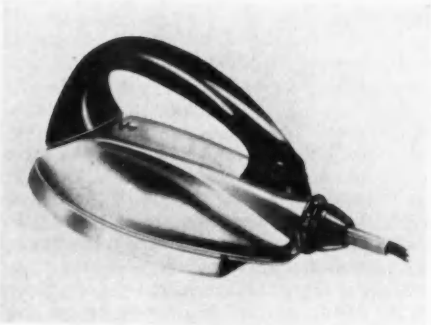
TWO new signal lamp fittings have been added to the range of products of MESSRS. A. F. BULGIN AND CO., LTD., Bye Pass Road, Barking, Essex.

They are Nos. D.620 and D.621. The first is a "jack lamp" holder for the standard G.P.O. type side contact "jack lamp." It is designed for circumstances of use other than the usual telephone type of holder. With its all moulded construction the holder permits of working up to 50 V across poles and up to 500 V to earth. The relative test voltages were 250 V peak across poles (× 5) and 2 kV peak from poles to earth (× 4) thus ensuring its suitability for incorporating in circuits connected to the supply mains. Lamps suitable for use with this holder are obtainable through the usual sources, whilst the Bulgin D.149 coloured lens-bushes are suitable for use in conjunction

with cover colours of white, red, amber, green, blue, and clear in transparent unbreakable plastic lenses. Price of the fitting is 3s. 6d.; D.149 lens-bushes retailing at 10½d. each.

The D.621 signal holder is a new miniature fitting (B.S. 52/add.) which will accept all such small capped bulbs (M.B.C. and M.C.C.). Maximum through current rating is 0·5 amp and it has been tested at 2 kV peak, pole to pole and pole to earth. Retail price is 3s. 3d. each.

Both new types, normally moulded in highly polished black bakelite type material, are complete with fixing nuts. Anti-rotating locating pegs are provided on the moulding.



"Clem" Thermo Controlled Iron is Here

JUST released by MESSRS. CLAYTON, LEWIS AND MILLER LTD., of Ludgate House, 107 Fleet Street, London E.C.4, the new thermostatically-controlled "Clem" electric iron, seen above, is an outstanding example of efficient streamlining.

The iron has an attractive appearance and is well balanced. In this new model the thermostat adjustment is at the rear of the iron and is easily adjusted. The iron is supplied with a highly polished chromium plate finish or alternatively with the cover finished in coloured heat-proof enamel. Prices and discount details may be had from the sales office at the above address.

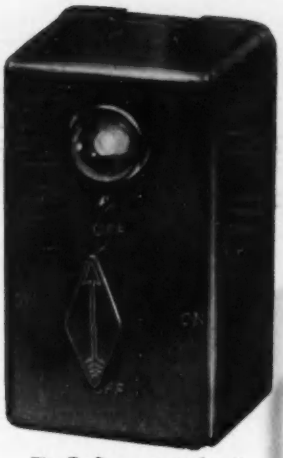
Remote Control for Home Appliances

A USEFUL control unit for many household appliances has been marketed recently by T. B. MORLEY AND CO., LTD., manufacturing electrical engineers of Jameson Street, Hull. It is the "Te Beam" indicating control switch which has been designed for a.c. operation with a normal rating of 15/20 amp. Supplied in fused and non-fused types the unit incorporates a specially designed micro-gap switch in a compact, high grade moulded case.

The switch itself is a rotary reciprocating on-off type rated at 15 amps 230 V a.c. with a double pole micro-gap action. The heavy stud-type contacts are of solid silver.

The fuseholder is of a special moulded pattern which automatically disconnects the B.S. 646 type "A" 2-amp cartridge fuse when opened. It is hinged to the main body of the unit and swings forward to allow the fuse to drop out.

The pilot lamp is a 230 V 0·5 W Neon Indicator (s.b.c.) in a unique built-in lamp-holder.



The Te Beam control unit

List price of the unit with lamp is 23s. 6d. (fused) and 22s. 6d. (non fused).

No Need now for Rust

FROM EDWARDS MANUFACTURING CO., of Manor Hill, Birkenhead, we have received leaflets and sample of "Penetreen 50," a penetrating and creeping lubricant containing colloidal graphite. "Penetreen 50" now contains a new wetting agent which, by reducing surface tension of the liquid, cause improved rapidity in absorbtion by rusted studs, nuts and fittings. Due to the presence of colloidal graphite it will lubricate over a considerable temperature range, and it is claimed that many parts can be saved for re-use which would otherwise be scrapped. It is obtainable for works use at 25s. a gallon.

TRADE PUBLICATIONS

SWITCHES. Three multicoloured leaflets have been issued by Diamond H Switches Ltd., Gunnersbury Avenue, London W.4, giving information on their wide range of Multi-circuit rotary and toggle switches.

FLUORESCENT LIGHTING. From Thorn Electrical Industries, Ltd., 105 Judd Street, London W.C.1, we have received list AL/39 giving latest prices of Atlas fluorescent fittings.

WIGGIN NICKEL ALLOYS is the title of periodical notes on this subject issued by Henry Wiggin and Co., Ltd., Wiggin Street, Birmingham 16.

ELECTRIC FURNACES. "Everything Electric" has long been the slogan of the General Electric Co., Ltd., Magnet House, Kingsway, W.C.2. In a brochure just issued (P.H. 9650) the range of electric furnaces made by the company reveals yet another factor in support of the slogan.

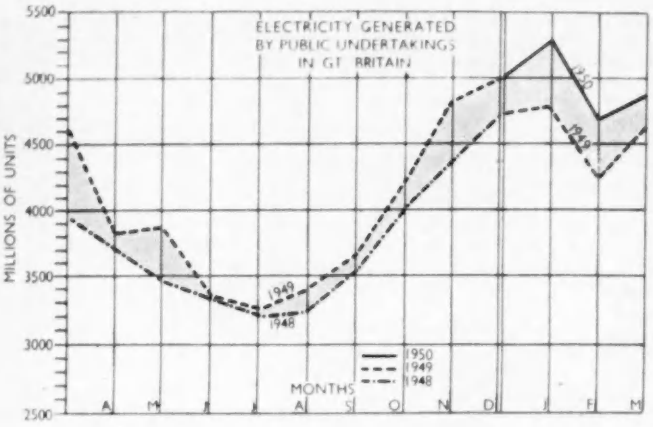
INDUSTRIAL FITTINGS. Mercury discharge and tungsten filament lighting fittings for use in industry are described in detail in catalogue 7116/2-1 issued by Metropolitan-Vickers Electrical Co., Ltd., 1-3 St. Paul's Churchyard, E.C.4.

UNITS GENERATED

During the month of March, 1950, a total of 4,870 million units was generated in stations under the control of the B.E.A., the North of Scotland H.E. Board and the Lochaber Power Company. The corresponding figure last year was 4,659, so there has been an increase of 8·9%.

Of the total, 4,739 million units were generated in steam stations and 112 millions in hydro-electric.

Energy sent out during the month was 4,598 million units, 94·5% of that generated. This gives the total for 1950 so far as 13,658 million units, an increase of 8·9% on the corresponding period in 1949.



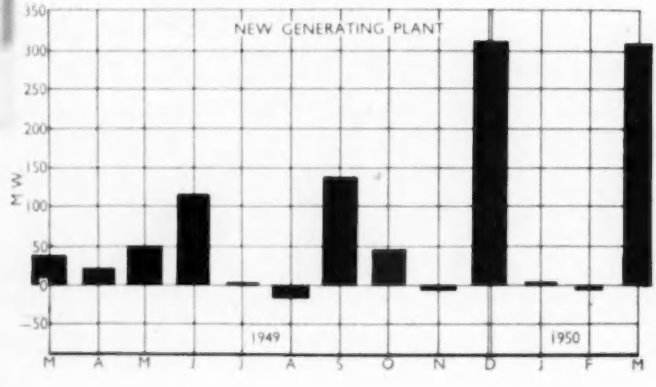
POWER SUPPLY IN MARCH

BOTH the B.E.A. and the North of Scotland H.E. Board substantially increased their generating capacity during March, and the combined total of sets installed, 310 MW, reached a new high level.

In the South Eastern Division the second 60 MW hydrogen cooled set (M.V.) was commissioned at Littlebrook B, and another 265 klb/hr boiler (International Combustion) was completed. Two similar boilers are required to finish this section of the station. Also in the division is Kingston, where the installation of the fourth 30 MW B.T.H. set and another 625 klb/hr B. and W. boiler leaves only one more boiler needed to complete the station.

Staythorpe, a new station in the East Midlands Division, came into operation with a 60 MW B.T.H. set and a 240 klb/hr B. and W. boiler. Three similar sets and 11 more boilers are programmed for completion by the end of 1952. Another E. Midlands station, North Wilford (Nottingham), has increased its output capacity with the installation of the first 320 klb/hr boiler (International Combustion) in its fourth section. Farther north, in the Yorkshire division, the commissioning of a 45 MW English Electric set at Ferrybridge increases the capacity to 170 MW and leaves three boilers as the outstanding programmed plant. Another station where all projected sets are now operating is Dunston B, in the North Eastern division. A 50 MW Parsons turbo-alternator has increased the installed capacity here to 300 MW.

Finally, in London, extensions at West Ham "B" have proceeded with the installation of the second of eight 180 klb/hr John Thompson boilers.



GENERATING PLANT

At the end of March the installed generating capacity of the B.E.A. was 13,842 MW, 259 MW more than at the end of February. The North of Scotland H.E. Board total has increased by 51 MW, and this brings the overall increase in the past 12 months up to 963 MW, or 7·3%.

The installed capacity, used for the purposes of this graph, should be distinguished from the output capacity. The installed capacity is the total m.c.r. of all the generating sets, which are connected on both steam and electrical sides and are suitable for use.

R.E.C.M.F. Exhibition

Component Manufacturers' Contribution to the Export Drive

THE seventh Annual Private Exhibition of the Radio and Electronic Component Manufacturers' Federation was held on Monday, Tuesday and Wednesday of this week in the Great Hall, Grosvenor House.

Opening the exhibition, Sir Robert Renwick, President of the Federation, emphasised the great part played by electronics in the modern world. An important recent development was the opening of the new television transmitter at Sutton Coldfield. Within the next two years other transmitters scheduled for completion would bring television within the reach of 80% of the people in this country.

Few people appreciated the contribution made by the industry to the export drive. During 1949, direct exports of components and associated products exceeded £4,000,000 in value. Valves, in the same period, were exported to a value of £2,000,000. Added to that was the value of components exported as complete sets. Altogether the total value was probably in the region of £12,500,000.

Exhibits

The exhibitors—over one hundred in number—were showing a bewildering variety of items. Emphasis, as in previous years, was primarily directed to miniaturisation, particularly for such items as deaf aids and aircraft radio equipment, although the general introduction of such components to the domestic field has resulted in the production of compact television and radio receivers. In the valve field, Edison Swan, Ferranti, G.E.C., Mullard and Standard Telephones and Cables were all showing representative examples of their products. A new flat sub-miniature for hearing aids by Mullard is so small that three will fit into a thimble. For use in the same device is a midget potentiometer by Morganite, believed to be the smallest in the world. Plessey's showed many of their products, including permeability tuning units using "Caslam," which is now available in special grades for television components.

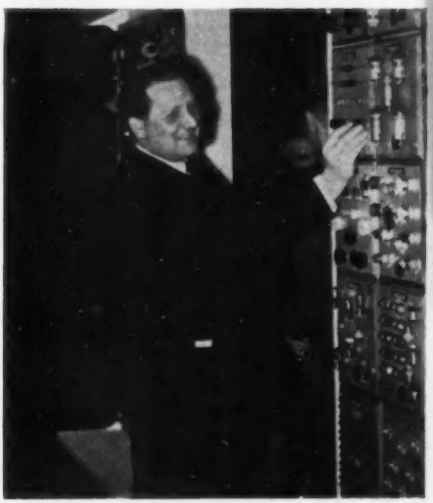
Another interesting material is "Permandur," a magnetic material of high saturation induction and permeability which can be produced in strip, rod, wire or forged. This is produced by Telegraph Construction and Maintenance Co.

A selection of cables and wires was shown by B. I. Callenders Cables, Ltd., whilst the use of "polythene" in radio frequency cables was illustrated by a large number of cut-away examples exhibited by T.C.M.

Several examples of the work being done by the Ministry of Supply were also on view, including a heavy duty vibrator capable of handling approximately 100 W at 24 V. Other vibrators have been designed for use in portable wireless sets as used by the Army, to eliminate h.t. batteries. The use of silicone and glass insulation is exemplified by a transformer designed to operate at a temperature of 150° C. This has an output of 75 W with an input of 125 W, and gives a saving of 66% in weight and space over a standard laminated type.

Instruments

Although the exhibition was mainly devoted to individual components, a certain number of instruments were also on view. Taylor Electrical Instruments were showing a pattern generator for lining up television receivers; Dawe Instruments had a sound level meter on view; Edison Swan exhibited a l.f. oscillator unit for calibration purposes, and Associated Electronic Engineers displayed a message storage device for recording telephone messages on magnetic tape.



Sir Robert Renwick at the Bulgin Stand

NEW LITERATURE

Engineering Management

by Struan A. Robertson

THE subject of management is coming to be accepted as an integral part of any service engineering course and an increasing number of universities and technical colleges are expanding their curricula accordingly. This book should, therefore, prove a useful supplement to such studies, particularly as it was based on a course of lectures to students at Battersea Polytechnic. The text, however, has obviously been revised to suit publication in book form. It is an exceedingly comprehensive study of the many different problems of management and these are treated largely from an objective standpoint so that the book is kept within manageable length. From it the student will learn the essential mechanisms of management, but it wisely cuts short the consideration of the personal factors which are, nevertheless, an essential ingredient to management, for such discussions are rarely helpful. The inclusion of a bibliography of each chapter is an important asset and we found of particular interest the chapter on the development of scientific management, a reminder that the subject is developing an historical background. This book is certainly one calculated to meet the needs of today. Published by Blackie & Son. 464 pages. Price 17/6.

Wirtschaftliche und Rechtliche Grundfragen der Energiewirtschaft

THIS publication is a report of a conference held in 1948 under the aegis of the Energiewirtschaft Institut of the University of Cologne, of which Professor Theodor Wessels is director. Although not limited to electricity supply, the scope of the conference was mainly in this field, and as a number of the leading engineers in Germany took part in the proceedings, the report provides an admirable survey of economic conditions affecting supply in that country. While considerable attention was given to such matters as taxes which are of more local concern, some of the problems of international interest such as the interconnection of undertakings to form large networks are discussed at length. The whole forms a valuable review in a field in which published information is scanty. Published by R. Oldenbourg, Lotzbeckstr. 2, Munich. 212 pages, 9 in. by 6¼ in. Price DM 8.80.

Basic Electrical Engineering

by G. F. Corcoran

FROM the simplified concepts of school physics to the more precise and specialised ideas required for professional work lies a path along which all engineering students must travel. The present volume is well designed to assist them. Using a vector approach and assuming a knowledge of elementary calculus techniques, it surveys the basic relationships of electrostatics, magnetism and current electricity in precise terms that should leave the student little to unlearn in later, more advanced studies.

As is to be expected in a basic course, the chapter is given over to a discussion of physical quantities, dimensional theory and the M.K.S. system of units. D.C. theory is then considered, with d.c. circuit analysis by mesh and nodal methods. This is followed by a development of electric field theory, magnetic field theory, inductance and capacitance properties, and a description of non-linear circuit elements.

Professor Corcoran has achieved a commendable clarity of statement in this useful book, which is specially strong in its treatment of field theory. Published by Chapman and Hall Ltd., 449 pages, 9 in. by 5¾ in. Price 36s.

NEW BOOKS

Recent Advances in Radio Receivers, by L. A. Moxon. Advanced notes on various details. Published by Cambridge University Press, 183 pages, 8½ in. by 5½ in. Price 18s.

Basic Electricity for the Million, by L. Houldridge. Elementary. Published by Crampton and Sons, Ltd., Sawston, Cambridge, 99 pages, 7½ in. by 4¾ in. Price 6s.

Electric Resistance Welding, by H. E. J. Butler. Survey of processes and applications. Published by George Newnes Ltd., 173 pages, 8½ in. by 5½ in. Price 17s. 6d.

Electric Circuit Theory, by H. Tropper. Advanced study. Published by Longmans Green, 164 pages, 8½ in. by 5½ in. Price 15s.

Electrical Measurements, by D. Karo. Concentrates on the calculation of the errors involved. Published by Macdonald and Co. (Publishers) Ltd., 191 pages, 8½ in. by 5½ in. Price 18s.

Power System Interconnection, by H. Rissik. Describes analytical and semi-graphical methods of calculating performance. Published by Pitman, 239 pages, 8½ in. by 5½ in., 2nd edition. Price 25s.

An Introduction to the Theory and Design of Electric Wave Filters, by F. Scowen. Published by Chapman and Hall, 188 pages, 8¾ in. by 5½ in., 2nd edition. Price 18s.

Electric Wiring (Domestic), edited by E. Molloy. Practical description. Published by George Newnes Ltd., 248 pages, 7½ in. by 5 in., 4th edition. Price 7s. 6d.

THE WEEK

INDUSTRY *in news* COMMERCE

John Brown to make Boilers

THE WELL-KNOWN shipbuilders and engineers, John Brown and Co. Ltd., have been accepted by B.E.A. as contractors for the manufacture of boilers for generating stations. Arrangements have been made by the company with Mitchell Engineering Ltd., to use their designs and engineering information.

Manufacturing work will be undertaken mainly at the company's shipyard and engineering works, Clydebank, but new shops are also to be built at Whitecrook, Clydebank. Certain specialised manufacture is to be undertaken by a number of subsidiary and associated companies.

Silver Jubilee for E.A.W.

ABOUT seven hundred "electrically minded" women are expected to attend the E.A.W. Silver Jubilee Conference which opens in Perth on May 1. Judging from the six-day programme just published they will have an interesting and absorbing time. At the opening session on May 2, speakers will include the Minister of Fuel and Power, the Rt. Hon. Philip Noel-Baker, Rt. Hon. Thomas Johnston, chairman, N. of Scotland H. E. Board, and Sir Edward MacColl, deputy chairman of the Board. Lord Citrine is to speak at a luncheon on the following day.

Other activities that have been arranged include a golf competition, a visit to the H.E. schemes at Pitlochry and Tummel Garry and a tour of Edinburgh.

E.A.W. are also arranging a five-day course for science and housecraft teachers at King's College of Household and Social Science. Commencing on September 21, the course will include lectures on electrical terminology and tariffs, theory construction and use of domestic electrical apparatus and teaching of electricity in schools. Practical classes will deal with elementary electricity and examination of electrical accessories. Fee for the course, including board and residence, is 6 guineas.

High Employment Continues

SOME indication of present employment trends in the electrical industry is obtainable from the latest *Monthly Digest of Statistics*. Compared with the figures for March, 1949, the most recent employment figures available (those for January this year) show an increase of 2,700 over the eleven-month period.

Last year's increasing sales of television and radio receivers appears to have affected employment in the wireless apparatus, gramophones, valves and lamps section of the industry, where 7,400 more people were taken on. The increase is partially compensated for by a drop in the number of employed in electrical machinery and wires and cables. In the former, 2,800 fewer women were employed, but the number of men increased by 1,600. A decrease of 2,500 in the wire and cable industry was evenly distributed between men and women.

Employment in the telephone, batteries, and other electrical goods side of the industry remained fairly stable, a decrease of 800 women being balanced by a similar increase in the number of men.

To Standardise T.V.

CONTINUING its examination of the technical factors controlling the co-ordination of television standards, study group No. 4 of the International Radio Consultative Committee meets again in London next month. The Group, which was appointed at a meeting of the C.C.I.R. in Stockholm in 1948, held its last meeting at Zurich in July, 1949. This month delegates are visiting U.S.A., France, Holland, and the U.K. to inspect the television systems and the work in progress in research establishments.

In this country they will visit the studios and transmitting equipment of the B.B.C. and G.P.O. and B.B.C. research establishments. The Radio Industry Council are arranging a series of visits to

The First Half-Century

Mr. Parshall had a few words to say on the evolution of this new (Lundell) dynamo. Dr. Hopkinson had worked out the mathematical law of distortion. Professor Thompson and other Englishmen had worked out the effect of an oblique coil. Changes in the shape of the pole pieces had been tried; Ryan had introduced magneto motive forces on the pole pieces, and Sayers extra coils on the armature. These devices had not proved commercially successful. The adaptation of the pole pieces to the distortion curve was due to Messrs. Johnson and Lundell—he put Mr. Johnson first.—"No," interrupted Mr. Johnson ,"give Lundell all the credit." "Well, I'll give him the credit and you the cash," replied Mr. Parshall.—*From our issue April* 19, 1900.

A group at the Liverpool I.E.S. centre's annual luncheon: Sir Vincent Z. de Ferranti (president, B.E.P.C. Council), Mr. K. R. Mackley (Hon. Sec.), Alderman J. J. Cleary (Lord Mayor of Liverpool), Dr. J. N. Aldington (I.E.S. president) and Mr. C. C. Smith (chairman, Liverpool centre)

industrial establishments. U.K. representatives include members from the G.P.O., B.B.C., the Department of Scientific and Industrial Research and the Radio Industry Council.

Board increases Cooker Sales

REINFORCING their intensive drive to increase cooker sales, S.W. Board have put a transportable cookery demonstration and display unit into service in the Bristol district. The unit enables demonstrations to be given in public halls in the city, and so to some extent overcomes the handicap imposed by the present lack of an adequate demonstration theatre, pending completion of the new Bristol service centre on the ground floor of the headquarters building at Electricity House.

Two series of afternoon and evening demonstrations have so far been held in suburban halls with an average attendance at each session of about fifty. Numerous inquiries have been received as a result of the demonstrations, and excellent sales figures have been achieved. Arrangements are now being made, in conjunction with the educational authorities, for senior schoolgirls to attend some of the future sessions.

Fashions in Fluorescent

FOR THE Jersey Fashion Parades, 1950—one of the notable series of fashion shows to be held in London this spring—an entirely new technique of presentation will be employed which may well usher in a new standard in fashion display.

Part of the salon will be converted into a small stage, lit by Atlas fluorescent theatre lighting equipment, recently introduced by Thorn Electrical Industries Ltd. Clever mixing of pink, blue, green and white fluorescent light will show the frocks in brilliant sunlight or in the colour of a winter morning, in the atmosphere of restaurant or night club, and in dramatic contrast, the blue glow of a moonlight night.

Provincial Exhibitions

ELECTRICITY is currently being featured at two large provincial exhibitions. At Waverley Market, Edinburgh, the Modern Homes and Health Exhibition closes on Saturday, after a fourteen-day run. Many of the exhibits came straight from the *Daily Mail* Ideal Home Exhibition, and the latest electrical appliances are extremely well represented.

Only a few electrical firms and N.W. Board are exhibiting in Manchester, however, where the 18th Building Trades Exhibition opened in City Hall, Deansgate, on Tuesday. Altogether there are 100 exhibits, which will be on view until April 29.

Return of the Theremin

ELECTRONIC methods of music production were given a fillip by the reappearance of Lucie Bigelow Rosen at the Wigmore Hall on Tuesday, when she gave a theremin recital with the Philharmonia quartet. This instrument, operating on a beat frequency between two r.f. oscillators, one of fixed frequency and the other varied by the capacitance to earth of the player's hand, has been in existence for more than twenty years but has previously failed to secure any wide popularity. Mrs. Rosen, however, has been interested for some years in the development of the theremin, and several instruments have been built for her

With this mobile kitchen unit, S.W. Board demonstrators will show housewives the latest cooking methods

by Leon Theremin, the Russian inventor, incorporating various improvements.

District Heating Talks

THREE Ministries—Health, Fuel and Power, and Works—have agreed to meet a deputation from two Manchester Corporation committees to discuss the proposed £5½ million district heating scheme for Wythenshawe estate. Last August the city's housing and Wythenshawe estate committees said the scheme would have to be abandoned unless the Government gave support. At a meeting of the Wythenshawe committee on Friday, however, the chairman, Councillor J. E. Fitzsimons, announced the Ministries' decision to meet a deputation.

Because the scheme is in the nature of an experiment, the Corporation are anxious that the Government should guarantee them against loss.

To make the scheme self-supporting, a weekly charge to householders of 7s. 6d. has been proposed. One of the major difficulties has been the disposal of the surplus current which would be generated by two thermal electric power stations. Apparently agreement has now been reached with B.E.A. to absorb this surplus into the national grid.

"New Look" Switchboards

MAHOGANY, or a similar hardwood, has for long been the traditional basis for telephone switchboards. When, some time ago, it was criticised on the grounds of appearance, the G.P.O. decided to experiment with other types of wood in an effort to achieve a more modern finish.

G.E.C. have just built one of these new types of switchboard in limed oak for the Gainsborough exchange in Lincoln. To harmonise with the new finish, switchboard fittings were changed from red to green, and other woodwork specially planned to harmonise. The result is a brighter and more cheerful switch room with a modern atmosphere.

B.I.F. Exhibit at Birmingham

IN an advertisement appearing on page 35 of this issue, Taylor Tunnicliff and Co. Ltd., incorrectly state that their B.I.F. exhibit will be on show at Earl's Court, London. This should read Castle Bromwich, Birmingham.

Lighting Shenfield Line Platforms

WHEN the electrified Liverpool Street-Shenfield line was brought into use (see our Sept. 29 issue, p. 415) fluorescent lighting fittings displaying the station name were installed for illumination of the covered station platforms. This type of lighting is now being extended to the open platforms by lanterns containing two 5 ft 80-W fluorescent lamps.

Fluorescent lanterns bearing the station name, at right angles to the track, now light platforms at Seven Kings

Specially designed by G.E.C. to requirements of the Electrical Engineer, Eastern Region, the lanterns are being erected at nine stations altogether. On single platforms, lanterns are mounted parallel to the track, while those on island platforms are placed at right angles. Some 179 lanterns will be required for the complete installation.

Railways exchange Staff

FURTHER collaboration between the nationalised railways of Britain, France and the Netherlands has just been announced by the Railway Executive. Under a similar scheme to that operating last year, groups of specially selected young railwaymen will study each other's job.

The groups will each comprise four officials representing the operating, commercial, civil engineering and mechanical and electrical engineering departments respectively. The Anglo-Dutch exchange will be for a period of four weeks and the Anglo-French for six weeks. Dutch officials are due in England on April 17. The French arrive on May 31, when both British parties will commence their tour.

Export Progress

A BRITISH electric time and date stamp, specially designed for the G.P.O., who have installed over 1,200 in main telegraphic offices throughout the country, is now being taken up by the South African Ministry of Posts and Telegraphs. Already 300 have been installed, and a further order for 80 will go into production shortly.

The stamp operates on an electric impulse system in conjunction with a master clock, and is manufactured by Blick Time Recorders Ltd. Subject to guaranteed frequency the machines can be supplied to plug in to mains supplies without transmitters or master clocks.

NEWS IN BRIEF

The National Coal Board are contemplating expenditure of £11 million to install new, and improve old, coking plants.

Proceedings of the first British Electrical Power Convention held at Torquay last year, have now been published in one volume.

European firms will receive a 50% reduction in freight rates for the return transportation of products they show at the first U.S. International Trade Fair in Chicago from August 7 to 20.

Restored to its pre-war splendour, the Egyptian Hall in Mansion House, London, was reopened for the Lord Mayor's Easter banquet yesterday. Nearly two hundred fluorescent tubes have been concealed in the cornice.

For the best paper on air conditioning received by December 31, 1950, the Institution of Heating and Ventilating Engineers will award the Napier Shaw premium for 1951, value £25.

Gloucester E.I.B.A. branch are to hold a garden party in the grounds of "Southwood," Midlands Board property at Cheltenham, on June 3.

Jamaica is to have a police radio network, and Marconi's Wireless Telegraph Co. Ltd., are supplying necessary transmitting and receiving equipment.

Electrical Wholesalers' Federation have just published a list of members arranged alphabetically under names and towns.

Production of some of the equipment they help distribute was seen by area radio representatives and head office staff of Edison Swan Electric Co. Ltd., who visited the Swindon factory of the Plessey Co. Ltd.

About 110,000 enquiries were dealt with by two departments of the London Chamber of Commerce last year, says the annual report for 1949.

Increasing their publicity efforts, London branch of the E.C.A. have just published the first issue of a journal entitled "Electrical Progress."

Questions in Parliament

Control of Materials and Goods

The Minister of Supply was asked for a list of the controls still exercised by his Department over the acquisition, manufacture or disposal of raw materials and manufactured articles. Mr. Strauss answered that control over raw materials included aluminium, copper, lead and zinc. Among the manufactured goods controlled were electrical hair-waving, hair-drying and hand-drying machines, water heaters, vacuum cleaners, heating pads and blankets, but excluding certain appliances for space heating and water heating, curling irons, waving irons, dry shavers, smoothing irons, lighters, lighter elements, hair clippers, drink mixers and fans with motors not exceeding 1/10 h.p.

Electric Whaling Apparatus

Sir T. Moore asked whether the apparatus for killing whales by electricity, of which mention was made last year, had now been given sufficient trial to decide whether or not steps should be taken to render its use obligatory. Mr. T. Williams answered that he was awaiting the return of the British whaling fleet for a report on the further trials carried out this season.

Electricity in Nigeria

When asked what consideration had been given to the development of electricity generation in Nigeria, and the possibility of co-ordinating electricity enterprise both with the Gold Coast and with French West African Colonies, Mr. J. Griffiths explained that the Nigerian Legislative Council was now considering the matter. A Bill was being considered, proposing the establishment of a publicly-owned Nigerian Electricity Corporation, and plans for the development of electricity generation were proceeding. The possibility of co-ordinating electricity enterprises with neighbouring territories would come before the Corporation to consider.

New Plant

Mr. E. Smith asked the Minister of Fuel and Power for the power needs for the whole country for 1950, 1951, 1952; how far he expected the needs would be met, and when load spreading would cease. Mr. Noel Baker replied that the estimated peak demands in average winter weather in 1950-51, 1951-52 and 1952-53 were 12,600 MW, 13,400 MW and 14,300 MW respectively. The deficit in average weather would be about 800 MW, 650 MW and 500 MW respectively, but extremely severe weather might increase the amounts by 1,000 MW. Load spreading for the winter just ended ceased on March 31.

Generating Plant

Asked about new generating plant, Mr. Noel Baker said before the industry was nationalised the C.E.B. every year reviewed the expected requirements for five years ahead, and planned extensions accordingly. The B.E.A. now did the same. In very few cases during the past four years had the original dates of delivery of plant been adhered to; in a number of cases, delays in getting possession of sites and in starting work on them had resulted in plant being ready before the buildings were ready. These cases related to orders given to work started before vesting day.

Electric Supply News

Belfast

A new generating station is to be erected on the West Twin island of Belfast Harbour, at an estimated cost of £4,000,000. The scheme has been put forward by the Northern Ireland Ministry of Commerce, which has asked the Belfast Corporation to take preliminary steps regarding the plant. The station, which will have an initial capacity of 30,000 kW, will be erected in two sections, the first of which is required for service in 1953-54.

Eastern Board

Christchurch is the first village in the Isle of Ely to receive a supply under a plan formulated by the Eastern Electricity Board. The inauguration ceremony took place recently. The scheme entailed the laying of about 3½ miles of 11 kV mains and 3 miles of l.t. mains at a cost of £5,436. There are 111 premises on the route of the mains.

Eire

Eire's first turf-burning power station, at Portarlington, was officially opened on Monday last by Mr. D. Morrissey, Minister for Industry. It will consume about 120,000 tons of machine-cut turf annually, from the adjoining Clonsast bogs. A light railway has been laid from the bogs to the power station. The Electricity Supply Board has two more turf-fired stations under construction, at Allenwood, County Kildare, and at Boora, County Offaly.

Meaford

Stone R.D.C. was informed at its recent meeting that although investigation into atmospheric pollution in the vicinity of Meaford power station was commenced 15 months ago it would take another two-and-a-half years to obtain conclusive evidence to bring pressure to bear on the British Electricity Authority.

North of Scotland

The first 19,000 kW generator at Clunie power station of the Tummel-Garry hydro-electric scheme, is now feeding into the North of Scotland Board's main transmission system. Members of the Board and their engineers visited the station to watch the machine being brought to full load. The other two 19,000 kW turbo-alternators in the Clunie station, and the two 7,500 kW sets at Pitlochry will be brought into service successively and will be in operation before next winter.

A considerable surplus of electricity from the North of Scotland hydro-electric plants is expected to be available for industrial undertakings in other parts of Scotland by the end of this year. The Board anticipates that after the growing requirements of the Highlands have been met, about 150,000 kW will be delivered to the B.E.A. next winter.

In the next ten years the North of Scotland Hydro-Electric Board hope to supply 100,000 new consumers, it is stated in the annual survey of Scottish economic affairs just published by the Clydesdale and North of Scotland Bank.

The Secretary of State for Scotland has confirmed the constructional scheme prepared by the North of Scotland Hydro-Electric Board, providing for the erection of o.h. transmission lines from Tummel Bridge, Perthshire, to Inveruglas on the west side of Loch Lomond. Estimated cost of the scheme is £498,000.

North Wales

At a meeting with Lord Citrine and B.E.A. officials earlier this month, members of the Welsh Parliamentary party were given an assurance that everything possible would be done to ensure that the proposed new hydro-electric projects will harmonise with the surroundings. The members were told that six projects are included in the scheme—at Conway, Mawddach, Rheidol, Snowdon, Festiniog and Nant Ffrancon.

Padiham

A 15 MVA transformer has been installed on the North Western Board's circuits at Padiham power station. This steps up from the 11 kV bus bars to feed a 33 kV line to Rochdale and replaces an old 3-phase bank of transformers totalling 12·75 MVA. In-phase and quadrature boost are incorporated in the transformer which enable the line to Rochdale to be loaded to capacity, thus giving an additional 5 MW capacity in the circuits to Rochdale, which, in addition to the Padiham-Rochdale circuit, include five circuits from Kearsley power station.

Yorkshire Board

This Board has announced that a further rebate of 0.2d. p.u. is to be given to domestic consumers to whom the Clow surcharge applied, operating during the quarter commencing with the first meter reading after May 1.

LIGHTING SCHEMES

Daventry.—Gas street lighting is to be discontinued and all future street lighting in the town will be by electricity.

Doncaster.—Improved street lighting to be installed from Belle Vue to the borough boundary. Estimated cost £5,363.

Downham Market.—The U.D.C. has agreed to utilise mercury vapour lamps in a new street lighting scheme.

Heywood.—The T.C. has made application to the M.o.T. for permission to proceed with new street lighting schemes in Bury and Rochdale Old Road and in Manchester Road from Coronation Avenue to the borough boundary at Middleton. Estimated cost £4,300.

Leyton.—Cost of illuminating the new Church Lane, Leytonstone, under-pass, by means of fluorescent side-lighting is estimated at £3,000.

Oswestry.—The M.o.T. has reported on the town's scheme for class "A" lighting on the main road through the borough.

Company Activities

British Aluminium

Consolidated trading profit for 1949, after charging management remuneration, was £1,538,359 (*£1,845,677*), plus income from allied companies, etc., £35,564 (*£100,143*), other investments £1,348 (*£2,888*), dividend and interest on investments in subsidiaries not consolidated £17,522 (*nil*), profit on sales of trade investments £143,228 (*£140,265*), profit on exchange £67,574 (*nil*), making £1,803,595 (*£2,088,973*). Depreciation takes £390,459 (*£345,360*), reserve for increased cost of plant replacements £200,000 (*£250,000*), debenture interest £150,000 (*£105,000*), interest on loans £11,292 (*£4,152*), hydraulic works maintenance £20,000 (*nil*), superannuation fund nil (*£20,891*), audit fee £2,379 (*£2,542*), taxation £302,694 (*£221,612*), deferred repairs carried out £62,500 (*£42,300*), leaving £551,203 (*£498,450*). Profit attributable to outside shareholders £2,643 (*£2,369*), to British Aluminium Co. £548,560 (*£496,081*), with £700,343 (*£658,284*) brought in, makes £1,248,903 (*£1,154,365*) available. To general reserve £125,000 (*£204,000*), income tax equalisation reserve £145,000 (*nil*), dividends £214,500 (*same*), contingencies reserve £30,860 (*£35,522*), leaving £733,543 carried forward.

Brush Electrical Engineering Co.

Consolidated trading profit for 1949 was £1,926,024 (*£1,319,420*). Depreciation of land and buildings absorbs £45,693 (*£33,351*), plant and machinery, etc., £258,128 (*£200,691*), loose tools £116,883 (*£47,894*), bank, mortgage and other interest £189,803 (*£161,688*), audit fee £8,032 (*£7,329*), leaving net profit of £1,309,485 (*£868,467*) subject to taxation. Directors' fees and special remuneration £5,092 (*£1,900*), management salaries and other emoluments £41,642 (*£38,009*), management remuneration and bonuses £44,998 (*£53,670*). With £39,496 (*£31,826*), profit adjustments arising from previous years, the total is £1,346,981 (*£900,293*), from which is deducted taxation £693,103 (*£248,783*), leaving net profit of £653,878 (*£651,510*). Transferred to general reserve £500,000 (*£250,000*), Preference dividend £30,250, interim Ordinary 4% £35,200 (*nil*), final Ordinary 6% £52,800 (*£44,000*), leaving £54,278 (*£18,220*) carried forward.

Drayton Regulator (Holdings)

The preliminary statement shows group profit of £52,416, after allowing all charges, including taxation. U.K. taxation absorbs £57,914; balance brought forward from the previous year of the subsidiary is £40,965. Ordinary dividend of 15%.

Glenfield & Kennedy

Consolidated group net profit for 1949 was £251,585 (*£230,425*), after charging taxation £350,282 (*£271,324*) and crediting provisions no longer required and other special receipts £4,159 (*£46,005*). There is a final Ordinary dividend of 15% (*same*), making 20%. Net profit attributable to outside shareholders is £9,322 (*£9,135*), and retained by subsidiaries £48,746 (*£90,036*), leaving parent company's net profit £193,517 (*£131,254*). To plant replacements and contingencies £100,000 (*£30,000*), and general reserve nil (*£15,000*). Dividends absorb £85,625 (*£83,469*), leaving £60,633 (*£52,741*), carried forward. (The figures in parentheses are the results of the parent company and two minor subsidiaries for nine months, and of the three major subsidiaries for a year.)

McMichael Radio

Trading profit, etc., for 1949 was £52,383 (*£59,297*). Net profit, after charging fees, taxes, etc., is £19,387 (*£17,491*). Ordinary dividend 8%.

Rheostatic Co.

Consolidated trading profit for the year to September 30 last was £108,624 (*£143,067*), plus £24 (*£500*) sundry revenue. Directors' fees absorb £250 (*same*), directors' remuneration £18,794 (*£20,182*), depreciation £16,206 (*£18,736*). Taxation £37,337 (*£40,869*), loss on exchange £2,249 (*nil*), leaving net profit £33,812 (*£53,530*). With £7,459 (*£17,087*) brought in, there is £41,271 (*£70,617*) available. To balance on profit and loss account of South African subsidiary £868 (*nil*), Preference dividends £2,640 (*same*), interim Ordinary dividend 6% £3,234 (*same*), investment reserve nil (*£3,175*), dividend equalisation reserve nil (*£6,000*), general reserve £12,669 (*£21,787*), final Ordinary dividend 10% on increased capital, £8,085 (*£7,546*), minority shareholders' interest £3,474 (*£9,651*), leaving £10,301 carried forward.

Watford Electric & Manufacturing Co.

Trading profit for 1949, after charging working and management expenses, was £37,552 (*£39,678*), plus other income, making a total of £41,063 (*£39,798*). Depreciation absorbs £2,127 (*£1,608*). With reserve for post-war change-over £5,000 (*nil*), profit on sale of investments nil (*£262*), and provisions no longer required nil (*£3,753*), and £60,557 brought in, makes £104,493 (*£91,828*). Taxation takes £20,134 (*£20,310*), special depreciation £1,045 (*£863*), Preference dividend £2,376 (*£2,178*), final Ordinary dividend 10% and bonus 5%, making 20%, £7,920 (*same*), leaving £73,018 carried forward.

Dividends Declared

Waygood-Otis. Final dividend of 15% (5%), making 35% (25%).

Sangamo Weston Ltd. Dividend of 10%, on the capital increased by 100% bonus issue, against 17½% for 1948. Profit for 1949 £116,144 (*£113,293*)

Sturtevant Engineering Co. Final dividend of 11% making 16½% tax free, on capital increased by 100% bonus issue. For 1948, total distribution was 22%, tax free. Group profit for 1949 is £442,396 (*£306,251*).

West London Provincial Electric and General Trusts. Final dividend of 5%, making 7% (*both same*).

Commercial Information

CONTRACTS OPEN

HOME

Apr. 21. — Bournemouth T.C. Installation of 2 pairs of electrically operated passenger lifts each capable of carrying 30 passengers for use on sea front at Woodland Avenue, Southbourne, and Manor Road West. Borough Engineer, Town Hall, Bournemouth. Deposit £2 2s.

Apr. 21.—N. Scotland H.E. Board. Construction of 250 miles of wood pole overhead distribution lines in Island of Skye. Kennedy and Donkin, Engineers, 12 Caxton St., S.W.1. Deposit £2 2s. (See our Apr. 13 issue.)

Apr. 22.—Consett U.D.C. Network for provision of street lighting. T. Hutton, Surveyor, Council Offices, Medomsley Road, Consett, Co. Durham.

Apr. 22.—Lancs C.C. Electrical installation for proposed 9 houses adjoining Whiston Fire Station, and proposed mortuary and ambulance station in Talbot Rd., Stretford. County Architect, G. Noel Hill, County Offices, Preston.

Apr. 24.—Bootle T.C. Sodium lighting equipment comprising lamps, lanterns, control boxes, line switches, pole, brackets and conductors. Borough Surveyor, Town Hall, Bootle.

Apr. 24.—Lincoln C.C. Maintenance of electric refrigerators, potato peeling machines, and mixing machines, for education committee. J. E. Blow, Clerk of the County Council, County Offices, Sleaford, Lincs.

Apr. 24.—Wortley R.D.C. Electrical installations in 13 hostel buildings to be adapted as temporary dwellings at Potter Hill Camp, High Green, near Sheffield. J. Gregory, Engineer and Surveyor, Council Offices, Grenoside.

Apr. 26.—Edinburgh T.C. A 100-watt v.h.f. transmitter, three sets fixed station equipment, five sets mobile equipment and two sets walkie-talkie equipment. Edinburgh City Police, Traffic Department, Cowgate, Edinburgh 1.

Apr. 28.—Altrincham T.C. Installation of street lighting on Stamford New Road-Railway Street (A538) from Barrington Road southwards to the Downs. Borough Surveyor, Town Hall, Altrincham. Deposit £2 2s.

Apr. 28.—Belfast T.C. 6,600 V and 400 V auxiliary switchgear and accessories for Harbour power station. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1. Deposit £5 5s. (See our Mar. 23 issue.)

Apr. 28.—Manchester. New electrically operated passenger lift for College of Technology. The Chairman, College of Technology Sub-committee, Education Offices, Deansgate, Manchester 2.

Apr. 28.—Reigate T.C. Electrical rewiring of Town Hall. G. G. Sanderson, Borough Surveyor, Town Hall, Reigate. Deposit £2. (See our Apr. 6 issue.)

Apr. 28.—Sowerby Bridge U.D.C. Alternative tenders for heating "Beech Royd," Beech Rd., by electricity. J. Normanton, Engineer and Surveyor, Council Offices, Sowerby Bridge. Deposit £1 1s.

Apr. 29.—Manchester T.C. Electrical installation for applied science block to be erected at Newton Heath Technical School, Newton Heath. City Architect, Town Hall. Deposit £1 1s.

May 1.—Blackpool T.C. 750 yd cable. T. T. Jones, Town Clerk, Town Hall, Blackpool. Advertised in this issue.

May 1.—Hitchin U.D.C. Electrical installation for 28 houses on Purwell Lane estate. Surveyor, Council Offices, Brand Street, Hitchin. (See our Apr. 13 issue.)

May 1.—Metropolitan Water Board. Five electrically driven inclined spindle low lift pumps for pumping station at Chingford South Reservoir. Chief Engineer's department (Room 122), Offices of the Board, New River Head, Rosebery Avenue, E.C.1.

May 1.—N. Scotland H.E. Board. Erection of 8¼ miles of 33 kV single-circuit wood pole overhead lines near Killin, Perthshire. Engineers: Merz and McLellan, 39 Northumberland Street, Edinburgh 3. Deposit £1 1s. (See our Apr. 6 issue.)

May 1. — N. Scotland H.E. Board. 11 kV and lower voltage single circuit wood-pole overhead distribution lines in the parish of Kilmarnock, Dumbarton. Engineers: Merz and McLellan, 39 Northumberland St., Edinburgh 3. Deposit £1 1s. (See our Mar. 30 issue.)

May 1.—Stockport T.C. Electrical engineering work for conversion of Heaton Lane tramways depot into omnibus depot. E. B. Baxter, general manager, Transport Department, Mersey Square, Stockport.

May 2.—Kirkcaldy T.C. Electrical work for 16 houses to be erected at Hendry Crescent. Measurers, J. Gentles and Son, 162 High Street, Kirkcaldy.

May 3.— Leitrim C.C. (Eire). Electrical installation in proposed new general hospital at Manorhamilton, including E.S.B. service and main switchgear, lighting, service plugs, power, sterilising and cooking installations and equipment, call system, fire alarms, telephones and electric laundering. Consulting Engineers, J. A. Kerry and Partners, 44 Kildare Street, Dublin. Deposit £15 15s.

May 5.—Sheffield T.C. Installation of electrical services to 342 houses being erected on Ballifield Hall estate. Town Clerk, Town Hall, Sheffield. Deposit £1 1s.

May 11.—Ipswich T.C. Electrical installation work at Castle Hill junior school. Architects, Johns and Slater, 32 Foundation St., Ipswich. (Applications by Apr. 25.)

May 12.—Belfast T.C. 33 kV and lower voltage transformers and CO_2 firefighting equipment. Merz and McLellan, Engineers, Carliol House, Newcastle-upon-Tyne. Deposit £5 5s. (See our Apr. 13 issue.)

May 12.—N. Riding Education Committee. Electrical installation at new county primary school at Saltburn-by-the-Sea. F. Barraclough, Secretary, Education Offices, County Hall, Northallerton.

May 13.—Lincoln C.C. Electrical work at Stubton Hall, near Newark. Council's Con-

sulting Engineers, E. G. Phillips, Son and Norfolk, Arskus House, Annesley Grove, Nottingham. (Applications by Apr. 28.) Advertised in this issue.

May 20.—Widnes T.C. Supply and erection of approximately 4·7 miles of street lighting. Borough Surveyor, Town Hall, Widnes.

May 20.—Annan T.C. Provision of 13 tubular steel columns, 25 brackets and 28 lanterns, with 240 W mercury electric discharge lamps; erection of 22 columns and installation of equipment on trunk road A75. A. Knox, Town Clerk, Town Hall, Annan, Dumfriesshire. Advertised in this issue.

May 23.—Belfast T.C. Stud welding gun. Transport Department, Sandy Row, Belfast.

No date stated.—Aberdeen. Electrical engineer work for addition of third storey at main building for Governors of Robert Gordon's Technical College. J. A. O. Allan Ross and Allan, Architects, 10 Bon Accord Square, Aberdeen.

No date stated.—Crayford U.D.C. Electrical installations for 47 dwellings for part one of housing scheme No. 22. Engineer and Surveyor, Town Hall, Crayford, Kent. (Applications by Apr. 29.) Advertised in this issue.

No date stated.—Durham C.C. Electrical installation in 10 police houses at Aycliffe, near Darlington. County Architect, Court Lane, Durham.

No date stated.—Kelso T.C. Electrical installation work for 23 houses at Inchmyre site. Town Clerk, J. Pennie, Kelso.

No date stated.—Midlothian C.C. Electrical work for eight houses at Auchenoinny; 94 houses at Limefield, West Calder; 36 houses at Whitecraig, Musselburgh. County Architect, 32 Palmerston Place, Edinburgh 12.

No date stated.—N. Riding C.C. Rewiring of lighting and small power services in police headquarters, Northallerton. H. G. Thornley, Clerk to Standing Joint Committee, County Hall, Northallerton. (Applications by Apr. 22.)

No date stated.—Whitburn Pithead Baths and Canteen Management Committee. Renewing wiring and lighting arrangements at Whitburn pithead baths. Secretary, W. C. James, Imeary St., South Shields.

OVERSEAS

Details of items marked • may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.

Apr. 28.—Lourenco Marques. Lathes, electric motors and precision instruments for Sa da Bandeira Technical School, Lourenco Marques. Permanent Purchasing Commission, Treasury Department, Lourenco Marques. B.o.T. (Ref. CRE (IB) 48816/50).•

May 5.—Durban. 700,000 sleeves for jointing conductor cables, 12 bells magneto extension and 12 telephones. Durban Corporation. B.o.T. (Ref. CRE (IB) 49670/50)•

May 5.—Durban. P.B.X. switchboard spares and cords. Durban Corporation. B.o.T. Ref. CRE (IB) 49671/50)•

May 5.—Durban. Total of 105 miles of various types of telephone wire. Durban City Council. B.o.T. (Ref. CRE (IB) 49619/50).•

May 5.—Montevideo. Switches, 3-phase sockets, alarm bells, night watch control instruments and ornamental concrete columns for lighting. Administracion Nacional de Combustibles Alcohol y Portland, Montevideo. B.o.T. (Ref. CRE (IB) 48810/50).•

May 9.—Montevideo. 6 pairs of bandpass filters intended for tone selection in a multi-channel telegraphic system of six channels. Direcion General de Communicaciones. Montevideo. B.o.T. (Ref. (IB) 48196/50).•

May 10.—Montevideo. 3 communications type receivers, 2 table type receivers, 2 portable accumulator and battery receivers. Servicio Oficial de Difusion Radio Electrica, Montevideo. B.o.T. (Ref. CRE (IB) 47165/50).•

May 11.—Buenos Aires. Boiler connecting pipes and a 15,000 kW generator for "Calchines" (Santa Fe) steam electric power station for Argentine Ministry of Industry and Commerce. Ref. No. 29/50, Direccion de Talleres y Suministros, Calle Lavalle 1556, Buenos Aires.

May 12.—Brisbane. 4,320 polyphase a.c. watthour meters, 50 cycle 240/415 V. Brisbane City Council. B.o.T. (Ref. CRE (IB) 47990/50).•

May 12.—Brisbane. 1,000 maximum demand indicators with maximum scale value and current rating of 6 amperes. Brisbane City Council. B.o.T. (Ref. CRE (IB) 47943/50).•

May 12.—Wellington. Co-axial cable (P. & T. 150/3293), ringing converters (P. & T. 150/3314). Director General (Stores Division), G.P.O., Wellington.

May 19.—Brisbane. Ten 33 kV oil circuit breakers. Brisbane City Council, Department of Electricity. B.o.T. (Ref. CRE (IB) 47917/50).•

Your Queries — Answered

"Crinothene" plastic sheet, makers of? T.E.—Imperial Chemical Industries Ltd., 2 Buckingham Gate, London S.W.1. (17969)

"Perfex" switchgear, makers of? L.E.B.—Standardise Switchgear Co., 104 Nechells Place, Birmingham 7. (17975)

"Tuco" hairdryer, makers of? T.E.—We presume this enquirer refers to "Duco" made by Brown Bros., Ltd., Gt. Eastern St., London E.C.2. (17980)

"Uvral" violet ray equipment, makers of? T.E.—Buckleys (Uvral) Ltd., Beta Works, Riverside, London S.W.15. (17984)

"Utilo" cookers, makers of? E.M.—They were made for Edmundsons Electricity Corpn. and were exhibited by undertakings such as the Staffs, Worcs and Shrops Co. around 1934. (17989)

"Sordoviso" switchgear, makers of? T.E.—Sordoviso Switchgear Ltd., Duke St., Loughborough. (17992)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"Unilek" ceiling fittings, makers of? T.E. (17997)

CONTRACTS PLACED

Berwick T.C. Internal wiring of 200 council houses. Radel Electric Co.

Gateshead Education Committee. Electrical installation at Lobley Hill Junior School. Tanjon (Newcastle) Ltd., £3,430.

Great Yarmouth T.C. Electrical installations for houses on Magdalen College estate. Yarmouth Electrical Services, £2,089 (recommended).

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d	New York price
COPPER, electrolytic	153 0 0	£140 0 0
Delivered in 2nd and 3rd month after order	154 10 0	—
Delivered in 4th, 5th and 6th month after order	156 0 0	—
LEAD, good soft pig (foreign)	84 0 0	84 0 0
" " " "English" quality	85 10 0	—
Delivered in 2nd and 3rd month after order, plus	1 0 0	—
TIN (99·99·75%) (Cash)	589½-590	—
" (3 months)	590½-591	—
ALUMINIUM, commercial purity (del)	112 0 0	—
ZINC	91 10 0	84 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.)	40 0 0	—
Mild Steel Tape (0·04 in.)	26 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

First Meetings

High Court of Justice.—E. M. Oliver and Sons Ltd., 425 High Road, Harrow Weald, Middlesex. Creditors and Creditors' meetings at 11.30 and 12 noon respectively at 4th floor. Columbia House, Aldwych, W.C.2 on April 26.

Leeds.—F. McMahon, 3 Exeter Street, Leeds, formerly carrying on business at Camden House Chambers, Leeds 2. Receiving order on debtor's petition filed on Mar. 30.

Raylite Displays, Ltd.—Meeting of creditors at offices of Messrs. Slater, Dominy and Swann, Sussex House, Hobson Street, Cambridge, on Friday, Apr. 21, at 12 noon for purposes mentioned in sections 294 and 295 of The Companies Act, 1948.

Raymax Electrical Co., Ltd.—General meeting to receive liquidator's account of winding up to be held at offices of Gray, Stainforth and Co., King William Street House, Archer Street, E.C.4, on May 13, at 10.30 a.m. Creditor's meeting to follow at 11 a.m.

Companies Winding-Up

R. H. Boyland and Co. Ltd., electrical engineers, 153 Seymour Place, London, W.1. First meeting of creditors was held on April 12. The Official Receiver reported that the company was formed in October, 1934, with a nominal capital of £2,500, of which £2,049 had been issued.

In January, 1949, the company entered into a large contract which involved complete redecoration, including installation of a central heating system, new sanitary fittings and electrical installations, estimated to amount to about £18,500.

Mr. Boyland estimated that the company had received payments totalling £17,300 and that by last February when work ceased a total of £20,000 had been spent, by which time most of the work originally contracted for had been completed. The Official Receiver said that it would appear, therefore, that the final settlement of accounts should include the amount due for work done, about £2,700, as well as the amount of the overheads and percentages of profit when that had been agreed upon.

Although Mr. Boyland had estimated that at the date of the winding-up order the gross liabilities of the company amounted to £9,100 (the Official Receiver stated, however, that proofs of debt had been received by his Department totalling over £10,000). Assets were expected to produce £7,100 and comprised loose tools and stock £500; amount due in respect of the large contract £4,000; payments due on other contracts £2,100; and book debts £500.

Main causes of the present position of the company appeared to be shortage of money; heavy outlay in respect of the large contract, and inability to collect book debts. A resolution was passed for the appointment of Mr. David Morgan, accountant, of 100 Park Street, Grosvenor Square, W., as liquidator, with committee of inspection.

Ward Electrical Engineering Co. Ltd., electrical engineers and contractors, 155 Wardour Street, London, W.1. First meeting of creditors was held recently. Mr. F. M. Collins, Senior Asst. Official Receiver, reported that the company was incorporated on October 17, 1938, with a nominal capital of £1,000, of which £603 had been issued, to acquire the business as a going concern known as Ward Electrical Engineering Co. at Wardour Street, W., a partnership that had traded since 1932.

In November, 1949, when a Receiver and Manager was appointed a statement of affairs submitted as at that time disclosed gross liabilities amounting to £5,941, which comprised: claims of preferential creditors £328; debenture £1,800 (Mr. Collins stated that there was a possibility that the debenture claim may be reduced to £300); trade accounts £2,194; outstanding expenses £248; bank overdraft £162; directors' loans £1,026, and other loans £183. Assets were expected to produce £2,329.

Failure of the company was attributed to restrictions on the issue of licences after the war, increases in costs of materials and increases in overhead expenses. A resolution was passed for the appointment of Mr. A. E. Attwood, accountant, 20-21 Lawrence Lane, London, E.C.2, as liquidator, together with a committee of inspection.

BANKRUPTCY ACTS

First Meetings

West Bromwich.—A. H. J. Timmins, 11 Laburnum Cottages, Windmill Lane, Smethwick, formerly carrying on business in partnership with another under the style of "T. H. J. Timmins and Rose" at 11 Laburnum Cottages. First meeting at 12 noon on Apr. 21 at Official Receiver's Office, Somerset House, 37 Temple Street, Birmingham. Public examination at 2.30 p.m. on May 31 at Law Courts, Lombard Street West, West Bromwich.

BUSINESS PROSPECTS

HOME

Aberdare U.D.C. Construction of 9 shops, 6 flats, garages and a public convenience on site at Penywaun neighbourhood. Engineer and Surveyor, Vestry Hall, Aberdare.

Ashington. Northumberland E.C. will begin work this year on a half million pounds scheme for a six-storey technical college at Ashington. County Architect, W. W. Tasker, County Hall, Newcastle-on-Tyne.

Ashton-under-Lyne T.C. Erection of 96 houses at Crowhill, scheme No. 4. A. T. Kemp, Borough Surveyor, Municipal Offices, Ashton-under-Lyne.

Brentford and Chiswick T.C. Erection of 24 flats at Edensor Gardens, Chiswick. Borough Engineer and Surveyor, Town Hall, Chiswick.

Belfast. Erection of 26 ex-servicemen's houses at Barnett's Road, Belfast, for Ministry of Finance. Room 103, Law Courts Building, May St., Belfast.

Blackpool T.C. Erection of 15 houses for Contract No. 12 on Mereside estate. Borough Surveyor, A. Hamilton, Municipal Buildings, Blackpool.

Brandon U.D.C. Submitted to M.O.H. proposals for 36 houses at Ushaw Moor at £44,000, 68 houses at Esh Winning at £70,000 and roads, sewers and street lighting at £18,363. U.D.C. to spend £1,500 on public conveniences at Brandon, New Brancepeth and Esh Winning, and £1,320 on the electric wiring of houses at Pringle Place. A loan of £44,316 is being sought for the erection of 36 old people's houses, community hall, roads, sewers and street lighting at Brandon Colliery. U.D.C. to spend £1,320 on electric wiring of houses at Pringle Place. F. Hedley is the U.D.C. Architect and J. Addison the Surveyor.

Chesterfield R.D.C. Erection of 12 houses on the Eckington, Birk Hill estate. Engineer, J. B. Wikeley, Rural Council House, Saltergate, Chesterfield.

Driffield R.D.C. Erection of 28 houses. Architect, F. Vaux, Danesmoor Chambers, 31 Quay Rd., Bridlington.

Gateshead. Licences issued to J. Rank, Ltd., millers, for erection of 18 houses for keyworkers at their new mill in South Shore Road.

Glenrothes Development Corporation. Erection of 18 houses at Alburne Knowe. Secretary, Auchmuty House, Markinch, Fife. Deposit 2 guineas.

Gloucester R.D.C. Erection of 12 houses at Brookthorpe and 6 at Sandhurst. Architect, C. D. Carus-Wilson, Hardwicke.

Hebburn-on-Tyne. Construction of a workshop block, as the first stage of a plan for a Mid-Tyne Technical College at the junction of Mill Lane and Victoria Road West. County Architect, G. R. Clayton, Court Lane, Durham.

High Wycombe T.C. Erection of 104 dwellings at Bookerhill, Micklefield and Copyground estates, High Wycombe. J. A. Parkinson, Borough Engineer and Surveyor, Municipal Offices, High Wycombe.

Inverness C.C. Erection of 100 houses at Caol, and 30 at Kinlochmore. County Architect, The Castle, Inverness.

Kearsley U.D.C. Erection of 24 cottage flats. Engineer and Surveyor, E. C. Kirk, Town Hall, Kearsley, Farnworth, Lancs.

Lindsey C.C. Erection of secondary modern school at Spilsbury (estimated cost £69,500), junior school at Horncastle (£67,570), junior school at Lincoln Gardens (£91,200) and infants school in Bushfield Road (£45,125). Surveyor, County Offices, Lincoln.

Loughborough T.C. Approved layout plan for housing estate near Thorpeacre village providing for 240 houses and also layout plan for land to south of railway lines where 400 houses can be built as first instalment. Borough Surveyor, Town Hall, Loughborough.

Lutterworth R.D.C. Erection of 22 houses at estimated cost of £29,407 approved. Surveyor, Council Offices, Lutterworth.

Middlesex C.C. Education Committee recommends, subject to M.o.H. consent to the raising of appropriate loans, and the grant of any necessary licences, that the County Architect arrange for the improvement of the electric lighting installations at Willesden, Dudden Hill School, at estimated cost of £3,200, and at Leopold Road School at estimated cost of £3,150.

Nantwich R.D.C. Erection of 8 houses at Cholmondeston. H. Crabtree, Engineer and Surveyor, Council Offices, Stapeley House, Stapeley.

North Riding C.C. Awaiting Home Office approval of a £5,600 scheme for converting "The Close," Brompton, into a children's nursery. County Architect, County Hall, Northallerton.

Penybont R.D.C. Erection of 54 houses. Surveyor, W. D. Davidson, Penybont Offices, Coity Road, Bridgend.

Rochdale T.C. Erection of a grammar school for boys at Balderstone. Borough Surveyor, Town Hall, Rochdale.

Salford T.C. Additional classrooms for Lancaster Rd. school. City Engineer's Office, Town Hall, Salford 3.

Sevenoaks R.D.C. Erection of 20 houses at Woodside Road, Sundridge. Engineer and Surveyor, "Inglewood," Oak Hill Rd., Sevenoaks.

Stourbridge T.C. Erection of 65 houses on Norton estate, part 11c. G. N. Maynard, Borough Engineer and Surveyor, The Council House, Stourbridge.

Stretford T.C. Erection of 16 houses on Park Rd. site. A. H. Perry, Borough Surveyor, Town Hall, Stretford.

Sunderland T.C. To let contract for 57 three-person type houses. Borough Architect, H. C. Bishop, Grange House, Stockton Rd., Sunderland.

Truro. Erection of proposed extension at Royal Cornwall Infirmary for West Cornwall Hospital management committee. A. J. Cornelius, 13 Lemon St., Truro.

Welton R.D.C. Erection of 8 houses at Ingham and 2 at Snarford. Architects, Wm. Saunders and Partners, 24 Castle Gate, Newark-on-Trent.

TRADE NOTES

Agent.—B. W. Hjorth A/S, Baunegaardsvej 27, Gentofte, Copenhagen, have been appointed exclusive agents in Denmark for the products of the BRUSH ELECTRICAL ENGINEERING CO. LTD.

Change of Address.—DEXION, LTD., are now at Triumph House, 189 Regent Street, W.1. Telephone 4841/5.

New Address.—On Monday next, EDSTONE LTD. will be moving to new premises at 15 Buckingham Palace Gardens, S.W.1. Telephone Sloane 0621.

MEETINGS TO NOTE

THURSDAY, APRIL 20

I.E.E. (ordinary meeting).—41st Kelvin lecture. "Phase-Boundary Potentials and their Significance in Chemistry." Professor E. K. Rideac Institution, Savoy Place, W.C.2.—5.30 p.m.

I.E.S. (Leicester centre).—"Black Light and its Applications." H. R. Ruff. Demonstration Theatre, E.M.E.B. Leicester sub-area, Charles. Street, Leicester.—6.30 p.m.

I.E.E. (N. W. centre).—Faraday lecture. "Radar." Dr. R. A. Smith. Lit. and Phil. Lecture Theatre, Westgate Road, Newcastle-on-Tyne.

BRIT. INSTN. RADIO ENGRS. (London section).—"U.H.F. Propagation and Characteristics." D. W. Heightman. London School of Hygiene and Tropical Medicine Keppel Street, W.C.1.—6.30 p.m.

FRIDAY, APRIL 21

I.E.S. (Bath and Bristol centre).—Luncheon and presidential address. J. N. Aldington. Grand Hotel, Bristol.

MONDAY, APRIL 24

I.E.E. (S. Midland supply and utilisation group).—"The Detection by Oscillographic Methods of Winding Failures During Impulse Tests on Transformers." E. C. Rippon and G. H. Hickling. Imperial Hotel, Birmingham.—6 p.m.

I.E.E. (Radio section).—Discussion: "The Relation between Production, Operation and Maintenance of Service Radio Equipment," opened by D. H. Hughes. Institution, Savoy Place, W.C.2.—5.30 p.m.

TUESDAY, APRIL 25

I.E.E. (N. Western supply group).—"The Cost and Efficiency of Earthing on Low- and Medium-Voltage Overhead Line Systems," L. Gosland. Engineers' Club, Albert Square, Manchester.—6.15 p.m.

I.E.E. (Scottish centre).—Annual general meeting. Institution Engineers and Shipbuilders, 39 Elmbank Crescent, Glasgow.—7 p.m.

I.E.E. (London extra meeting).—"The Design and Operation of a 30 MeV Synchroton," D. W. Fry, J. Dain, H. H. H. Watson and H. E. Payne. "The Design of Electron Synchrotons," F. K. Goward, J. D. Lawson, J. J. Williams and R. Carruthers. Institution, Savoy Place, W.C.2.—5.30 p.m.

E.A.W.—Demonstration of Refrigeration and Cold Cookery. Miss M. E. Bailey, 35 Grosvenor Place, S.W.1.—2.15 p.m.

WEDNESDAY, APRIL 26

WOMEN'S ENGINEERING SOCIETY (Manchester branch).—"Electrical Insulating Materials," J. N. Hardwich. Engineers' Club, Albert Square, Manchester 2.

I.E.E. (London supply section).—"Design of Power Transformers to Withstand Surges due to Lightning; with Special Reference to a New Type of Winding," A. T. Chadwick, J. M. Ferguson, D. H. Ryder and G. F. Stern. Institution, Savoy Place, W.C.2.—5.30 p.m.

I.E.E. (N. Midland centre).—"Fault Throwing Tests on the 132 kV Grid System under Normal Working Conditions." W. Casson and F. Birch. Joint meeting with N.W. centre and Sheffield sub-centre. No. 2 sub-area headquarters, Yorkshire Board, Market Street, Huddersfield.

I.E.E. (Southern centre).—"Rationalised M.K.S. Units in Electrical Engineering Education," E. Bradshaw. Royal Hotel, Weymouth.—6.30 p.m.

INSTN. RADIO ENGRS. (W. Midlands section).—"Inter-modulation Analysis," C. R. Amey. Wolverhampton and Staffordshire Technical College, Wufrune Street, Wolverhampton.—7 p.m.

THURSDAY, APRIL 27

INST. FUEL.—Presidential address: "Education and Survival," Dr. D. T. A. Townend. Connaught Rooms, Great Queen Street, W.C.2.—2.30 p.m.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Berley (Developments) Ltd., 35 Gloucester Place, W.1. Designers, manufacturers of and dealers in electrical and radio apparatus, etc. Cap.: £6,000. Dirs.: D. Horwich, S. M. Horwich, M. W. Woodard.

Cheltenham Refrigeration Co., Ltd., 15 Suffolk Rd., Cheltenham. Cap.: £5,000. Dirs.: H. W. Milner and Joyce Milner, G. Bearcroft and Mrs. B. E. Bearcroft.

Exhibition Electrical Installations Ltd., 6 Bostel House, West St., Brighton, Sussex. Cap.: £1,000. Dirs.: J. D. Rose, F. C. Slade, R. G. Davison.

T. and H. Electrical Service Ltd., 776 Barking Rd., E.13. Electrical engineers and contractors, etc. Cap.: £2,000. Dirs.: A. F. Todman, J. R. Hammond, C. W. Leech.

Luxelectric Ltd., 153 Tankerville Drive, Leigh-on-Sea, Essex. Take over business of electrical apparatus manufacturers and distributors carried on at Leigh-on-Sea as "Luxelectric Developments." Cap.: £1,000. Dirs.: G. W. Luck and Marjorie A. Luck.

Magnetic Recordings Ltd., 9 Denmark St., Bristol 1. To acquire the benefit of a concession granted to Sidney R. Gage by Wirek (Electronics) Ltd., for the wholesale distribution in the Western Counties including Somerset, Dorset, Bristol, Bath and South Wales of the said company's products, etc. Cap.: £2,000. Dirs.: S. R. Gage, E. P. H. Jones.

Neoflo Signs Ltd., 14 Leadenhall St., E.C.3. Proprietors or distributors of and dealers in signs, materials and equipment, etc. Cap.: £30,250. Dirs.: K. M. Perry, A. T. Roberts, A. Krakauer.

Santone Electrical Co. (Leeds), Ltd., 4 Oxford Place, Leeds 1. To take over business of electrical engineers and contractors carried on at Leeds, by the Santone Electrical Co. Cap.: £1,000. Dirs.: H. W. Sanders, Mrs. E. H. Sanders, C. H. Stone and Mrs. R. Stone.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Actum.—683,343. Class 1. Compounds of sulphuric acid, distilled water and glycerine for maintaining and keeping constant the specific gravity of the electrolyte in accumulators. Diamex Ltd., Norfolk House, Laurence Pountney Hill, London E.C.4.

Creda Cadet.—685,074. Class 11. Installations and apparatus for cooking and heating purposes. Simplex Electric Co. Ltd., Broadwell Road, Oldbury, Birmingham.

Limit.—683,352. Class 7. Electric motors (not for land vehicles) and electricity generators. Limit Engineering Co. Ltd., 15/29 Windsor Street, Essex Road, London N.1.

Teddington Controls with design.—B671,416. Class 7. Pneumatically and electro-pneumatically operated jacks for controlling the mechanisms of aircraft installations. B671,417. Class 9. Electrical relays and electrical solenoids, etc., all for use in aircraft. Teddington Controls

Ltd., Cefn Coed, Merthyr Tydfil, S. Wales.

Woodwelder. B668,204. Class 9. High-frequency generators for use with di-electric heating apparatus in the bonding of laminated materials. Short Wave Plastic Forming Co., 2921 Alameda St., Burbank, California.

WR with design. B648,412 Class 9. Electrically operated valves incorporating thermostatic controls; thermostats; controlling appliances consisting of electric switches operated by pressure-responsive or temperature actuators for use in furnaces, etc. White-Rodgers Electric Co., 1209, Cass Ave., St. Louis, Missouri.

SWITCHGEAR AND COWANS

Mr. Hugh Burroughes's Speech

THE thirty-ninth annual general meeting of Switchgear and Cowans, Ltd., was held on April 18 at Elisnore-road, Old Trafford, Manchester, Mr. Hugh Burroughes (chairman of the company) presiding.

The secretary (Mr. Leonard Holland) read the notice convening the meeting and the report of the auditors.

The following is the chairman's speech, which had been circulated with the report and accounts for the year ended December 31, 1949, and was taken as read:—

This is the last time I shall have the pleasure of addressing you at these meetings, the reason being that my many other interests prevent me from giving the time I should like to devote to the interests of your company. I have, therefore, come to the conclusion that I ought to relinquish this pleasant duty and retire from the chair on the occasion of this annual meeting.

The New Chairman

I am proud of my association with Switchgear and Cowans, Ltd. It has grown out of all recognition since I became your chairman in 1936, and the greater part of the credit is due to the constructive work of your managing director, Mr. Chamberlain, in whose favour, with your permission, I am vacating the chair and to whom I will hand over a little later in today's proceedings. The company's capacity, both from the technical and production points of view, has been very greatly improved during these 14 years.

I will now deal briefly with the affairs of the company for the year ended December 31, 1949. You will see that the overall profit figure is slightly higher than that of last year. It could have been higher still as the output has increased by 20% but, in accordance with the general policy advocated by H.M. Government, price increases were avoided although amply justified. The company's reward for this restraint has been an increased profits tax, which leaves a still smaller proportion of the profits to be ploughed back into the business for future development and progress. It is still unfortunately, not recognised by the Government that continuity of employment must eventually be jeopardised by such heavy taxation.

We are, I think, entitled to assume that the method we have adopted during recent years of presenting our accounts, is clear and straightforward since no queries or comments have been forthcoming either from our stockholders or the financial Press.

It is, therefore, unnecessary for me to deal with any specific points, except in the course of dealing with any questions that may be put to the Board at this meeting.

Where the Money Goes

It is, however, interesting to note where the money goes and I can give you approximate figures for the parent company. For every £ of output during 1949, the following is the make up:—

	s.	d.
Materials	8	2½
Salaries and wages	6	5
Overhead charges, including power, light, heat, rates, maintenance, depreciation, etc.	3	1
Works and staff bonuses and pensions	0	4½
Taxation	1	1½
Dividends	0	6½
Retained in the business	0	3½
	20	0

We propose again to pay a dividend of 20% and we hope that in the not too distant future conditions will be such that we may improve on this.

Future Activities

With regard to the future activities of the company, we hope to make considerable further progress this year in opening up fresh markets. We have a number of new designs which are now being tested to obtain the necessary certificates of performance which are required to enable us to retain the confidence of our customers.

Our products are still in great demand by the British Electricity Authority, the National Coal Board and other users, both in this country and abroad, and we expect a further increase in output this year which will absorb the whole of the capacity of our present works, but we have plans for the future which will add further stature to your company.

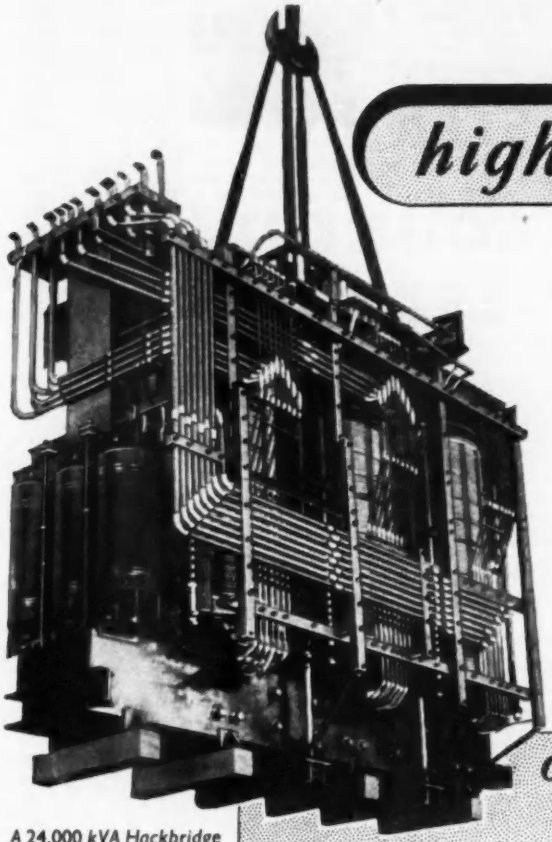
Thanks to Staff and Workpeople

In conclusion, it gives me great pleasure to offer thanks to the staff and workpeople who have done so much, not only on the routine work, but also on the heavy programme of development work which has been carried out during the past year and which continues in this current year. It is only when friendly relations exist between management and employees that the extra effort at a vital time can be sought with the full assurance that it will be forthcoming. That valuable co-operation, added to the steady growth of our technical and production resources, is the secret of the present successful results and augurs well for the future of your company.

The report and accounts were adopted; and the dividend, as recommended, was approved.

The retiring director, Mr. J. L. Rowbotham, was re-elected and the remuneration of the auditors, Messrs. Carter Chaloner and Kearns, was fixed.

At a subsequent extraordinary general meeting a special resolution altering the articles of association was approved.



A 24,000 kVA Hackbridge transformer for installation at a British power station.

high quality

outstanding feature of

HACKBRIDGE
TRANSFORMERS

TRANSMISSION and Distribution Engineers the world over have learnt from long experience to look up to the high quality of design and workmanship in HACKBRIDGE Transformers.

The Hackbridge and Hewittic Electric Co. Ltd. is very proud of this reputation, sustained for more than a quarter of a century, during which over **SIXTEEN MILLION kVA** of Hackbridge Transformers have been manufactured, including a number of the world's largest units.

HACKBRIDGE AND HEWITTIC ELECTRIC CO. LTD., WALTON-ON-THAMES, SURREY

Telephone: Walton-on-Thames 760 (8 lines) Telegrams: "Electric," Walton-on-Thames

All the newest technical improvements available to contractors will make this new estate a worthy contribution to the housing problem. It will make big demands on electrical services for its many domestic needs. So, METALLIC conduits will assuredly be specified—chosen for its unfailing reliability, meticulous accuracy and simplicity of assembly. METALLIC is processed from laboratory-tested flawless metal—

The SAFE conduit for SAFE conduct

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THE METALLIC SEAMLESS TUBE CO. LTD.
LUDGATE HILL, BIRMINGHAM. TEL: CEN 7167.
Also at London, Newcastle-on-Tyne, Leeds Swansea and Glasgow.

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

URBAN DISTRICT COUNCIL OF CRAYFORD

Housing Scheme No. 22—Part I

ELECTRICAL INSTALLATIONS—47 DWELLINGS

APPLICATIONS are invited from specialist firms for inclusion in an approved list of electrical sub-contractors from whom tenders will be invited for the electrical installations in T.R.S. cables for the above-mentioned scheme of houses and bungalows to be erected at Slade Green.

Firms desirous of being considered should submit their names to the Engineer and Surveyor, Town Hall, Crayford, Kent, not later than noon on Saturday, April 29, 1950.

G. B. HODGSON,
Clerk of the Council.
(E 397)

BURGH OF ANNAN

TENDERS are invited for the whole of the following works in connection with the provision of Street Lighting on Trunk Road A 75 within the Burgh of Annan.

(a) Provision of 13 tubular steel columns.
(b) Provision of 25 brackets and 28 lanterns together with 240 watt mercury electric discharge lamps.
(c) Erection of 22 columns and installation of lighting equipment.

General Conditions of Contract and terms may be seen, and Specification and Bill of Quantities may be obtained from the undersigned at the Town Hall, Annan, Dumfriesshire.

Tenders, in plain sealed envelopes, endorsed "Tender for Street Lighting—Trunk Road A 75," must be delivered to the undersigned not later than May 20, 1950.

ALEC KNOX,
Town Clerk.

Town Hall, Annan, Dumfriesshire. (E 398)

BOROUGH OF WIDNES

STREET LIGHTING

TENDERS are invited for the supply and erection of approximately 4.7 miles of Street Lighting to conform to the general requirements of the Ministry of Transport Departmental Committee's Final Report on Street Lighting, in particular to the Lighting of Traffic Roads (Group A).

Plans and General Conditions of Contract may be seen and copies of the Specification, Form of Tender and Schedule of Prices, obtained on application to the Borough Surveyor, Town Hall, Widnes.

Tenders are to be addressed to the Town Clerk, Town Hall, Widnes, and delivered to his office not later than first post on Saturday, May 20, 1950, enclosed in the envelope provided, endorsed "Tender for Street Lighting."

FRANK HOWARTH,
Town Clerk.

Town Hall, Widnes.
April, 1950. (E 419)

COUNTY BOROUGH OF BLACKPOOL

TENDERS are invited for the supply and immediate delivery of 750 yards of 0.1 sq in. 660 V, l.t. paper insulated, lead covered, double steel tape armoured 4 core cable with shaped conductors. Manufactured to B.S.S. 480/1942.

Tenders, enclosed in a plain sealed envelope endorsed "Tenders for Low Tension Cable," and not bearing any mark indicating the sender must be delivered to me at the Town Hall, Blackpool, not later than noon on Monday, May 1, 1950.

The Council do not bind themselves to accept the lowest or any tender.

TREVOR T. JONES,
Town Clerk.
(E 435)

COUNTY OF LINCOLN—PARTS OF KESTEVEN

Stubton Hall—near Newark

THE County Council is proposing to carry out Electrical Works at the above premises and invites reputable contractors to indicate their willingness to submit tenders for such work if selected to do so.

Selected firms will be supplied with forms of tender, specifications, and drawings on application to the Council's consulting engineers, Messrs. E. G. Phillips, Son and Norfolk, Arskus House, Annesley Grove, Nottingham, not later than April 28, 1950.

Tenders must be delivered not later than May 13, 1950, and should be addressed to the undersigned in plain sealed envelopes endorsed "Tender—Stubton Hall—Electrical Works." The envelope must not bear any mark or name indicating the sender.

Conditions of contract may be inspected at the County Offices, Sleaford. Any contract entered into shall comply with the Standing Orders of the County Council, and the Council does not bind itself to accept the lowest or any tender.

J. E. BLOW,
Clerk of the County Council.

County Offices, Sleaford, Lincs.
April, 1950. (E 399)

APPOINTMENTS VACANT

CROWN AGENTS FOR THE COLONIES

METER SUPERINTENDENT required by Nigerian Government Electricity Undertakings for two tours each of 18 to 24 months with prospect of permanency. Salary (including expatriation pay), £860, rising to £970 a year. Outfit allowance £60. Free passages and liberal leave on full salary. Candidates, preferably under 40, must be fully conversant with fixing, testing and maintenance of all types of A.C. and D.C. (single and Polyphase) meters, and with protective systems and the testing and maintenance of operative and protective gear. A knowledge of the Solkor protective system is essential.—Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting M/N 24901(3B) on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (E 391)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of SECTION ENGINEER (Towyn/Dolgelley) in the Aberystwyth district No. 5 Sub-Area.

Applicants should possess sufficient technical qualifications to enable them to become Chartered Electrical Engineers, and should have experience in all branches of work associated with distribution, including design, construction and operation of e.h.t., h.t. and l.t. overhead and underground systems, including indoor and outdoor substation equipment. The Towyn/Dolgelley Section is predominantly rural but includes small urban areas.

The salary offered will be within the range £430/£470 per annum, and will be provisional and subject to any adjustment that is necessary after negotiation with the appropriate staff organisation.

The successful candidate will be required to satisfy the Board's Medical Adviser, and if eligible to contribute to a Superannuation Scheme.

Forms of application may be obtained from the Manager No. 4 Sub-Area, Electricity House, Rhostyllen, Wrexham, and should be returned to him, so as to be received not later than May 4, 1950.

JAMES RANKIN,
Secretary.
(E 423)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following post in the Generation Construction Department at Divisional Headquarters in North London:—

ASSISTANT ENGINEER (Mechanical). Applicants should preferably have attained degree standard and served a recognised workshop apprenticeship. They should have had experience with mechanical plant associated with modern generating stations.

Salary according to qualifications and experience within the range £606-£699 p.a., plus 5 per cent. London weighting in accordance with the N.J.B. Schedule dated April 1, 1948, Grade 7-5, Class "J."

The salary is in accordance with the scale at present operating, but will be subject to negotiation through the medium of the Joint Board.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than April 28, 1950. Envelopes should be endorsed "Assistant Engineer (Mechanical), Generation Construction Department."

W. N. C. CLINCH,
Controller.

Northmet House, Southgate, N.14. (E 359)

SOUTH EASTERN ELECTRICITY BOARD

Guildford District

DRAUGHTSMAN

PROVISIONAL salary of £390 per annum. Superannuation will be arranged. Applicants, who must be suitably qualified, will be required to prepare diagrams and drawings of substation layouts; system diagrams for operational purposes and the plotting of profiles for overhead lines.

Applications, giving two referees, must reach W. E. Affleck Esq., M.I.E.E., M.Inst.F., Guildford Manager, South Eastern Electricity Board, Woodbridge Road, Guildford, Surrey, by May 1, 1950.

A. L. BURNELL,
Secretary.

April, 1950. (E 422)

BRITISH ELECTRICITY AUTHORITY

APPLICATIONS are invited for an appointment as ASSISTANT HYDRO-ELECTRIC ENGINEER in the Station Development Section of the Generation Design Branch of the chief engineer's department in London.

Applicants should possess an honours degree and the requisite qualifications for corporate membership of either the Institution of Electrical or Civil Engineers, and should have a sound practical training and experience in the development, construction and operation of hydro-electric schemes. The duties will comprise the examination and appraisal of proposals, advisory work at headquarters and liaison with divisions in which hydro-electric schemes are projected or in operation.

The appointment, which is superannuable, will be within the appropriate Grade of the N.J.B. Agreement with a starting salary of between £755 and £1,169 per annum, including London allowances, according to qualifications and experience.

Application forms may be obtained from D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London W.1, and should be completed and returned to him not later than May 8, 1950. Please quote reference AE 61. (E 424)

EASTERN ELECTRICITY BOARD

Chief Accountant's Department

ACCOUNTANCY ASSISTANT

APPLICATIONS are invited for a Senior Assistant's appointment in the Chief Accountant's Department at Ipswich.

The duties will include the critical examination and presentation of statistics, forecasting and budgetary control. An accountancy qualification and experience in the electricity supply industry will be an advantage.

In accordance with the National Joint Council Salary Agreement, dated March 23, 1950, the commencing salary will be not less than £570 per annum, or more than £630 per annum, and conditions of employment will be as laid down from time to time by the appropriate negotiating bodies.

The successful applicant will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, stating age, education, qualifications, and experience, and details of present appointment and salary, should be addressed to The Chief Accountant, Eastern Electricity Board, Broughton House, Broughton Road, Ipswich, Suffolk, so as to arrive not later than 10 days after the appearance of this advertisement.

April 5, 1950. (E 376)

SOUTH WEST SCOTLAND ELECTRICITY BOARD

Dumfries and Galloway Sub-Area

APPOINTMENT OF SENIOR ASSISTANT ENGINEER (CONSTRUCTION)

APPLICATIONS are invited for the position of a Senior Assistant Engineer (Construction) on the staff of the Sub-Area Engineer.

The general duties will comprise Constructional Work and include Civil Engineering, in addition to Electrical Engineering work.

Applicants should be corporate members of the Institution of Electrical Engineers and should have a sound technical training and experience in the design, planning, layout and erection of 33 kV, 11 kV and low voltage overhead and underground mains and sub-stations in an extensive rural area.

The post is superannuable and the commencing provisional salary will be £821 per annum. Future salary and conditions of service will be in accordance with Agreements made from time to time by the appropriate negotiating bodies.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to reach the undersigned not later than May 3, 1950.

W. H. WILLS,
Manager.

Marchmount, Dumfries.
April 6, 1950. (E 390)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the position of ASSISTANT SHIFT CHARGE ENGINEER at Walsall Generating Station, Class "G," Grade 9, commencing salary £571 per annum.

Applicants should possess the National Certificate in mechanical engineering or equivalent qualifications and should have had sound technical training. Experience in power station operation will be considered an advantage.

Salary and conditions of service will be in accordance with the N.J.B. Agreement, and superannuation under terms approved by the British Electricity Authority.

Applications should be made on forms which may be obtained from the Divisional Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and be returned not later than May 6, 1950.

F. W. LAWTON,
Divisional Controller.

April 12, 1950. (E 413)

DOCKS AND INLAND WATERWAYS EXECUTIVE

THE Docks and Inland Waterways Executive, 22 Dorset Square, London N.W.1, invite applications for the position of ASSISTANT ELECTRICAL ENGINEER (South Wales Docks) at Cardiff. Applicants must hold an engineering degree or be an Associate Member of the Institution of Electrical Engineers. They should have had experience of l.t. and h.t. distribution systems and of the electrical machinery normally associated with dock installations.

The commencing salary will be £650 per annum and the person appointed will be required, if eligible, to join a Contributory Superannuation Scheme, and in this respect to comply with whatever provisions are decided upon later for the executive's staff as a whole.

Applications, giving full details of qualifications and experience, should be sent to the Secretary, at the above address, to arrive not later than May 10, 1950. (E 416)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of ASSISTANT SECTION ENGINEER in the Liverpool district.

The commencing salary will be in accordance with Class "AX," Grade 6 of the N.J.B. Schedule, i.e. within the range of £516-£647 per annum.

Applicants should possess a recognised degree in electrical engineering or equivalent qualifications, and must have had sound experience in the maintenance and operation of 132 kV switchgear, transformers, overhead lines and cables.

The appointment will be superannuable under the British Electricity Authority and Area Boards' Superannuation Scheme, and the successful candidate may be required to pass a medical examination.

Forms of application can be obtained from the Divisional Secretary, British Electricity Authority, Merseyside and North Wales Division, Clarke Gardens, Woolton, Liverpool, and should be returned in a sealed envelope, endorsed in the top left-hand corner "Assistant Section Engineer—Transmission," so as to be received not later than first post on Friday, May 5, 1950.

A. R. COOPER,
Divisional Controller.

(E 411)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

STOCKTAKER

APPLICATIONS are invited for the position of Stocktaker at this Divisional Headquarters.

The successful applicant should have first-class knowledge of electrical stores as applied to Generating Stations and Transmission Lines, and must be prepared to travel throughout the East Midlands area for the purpose of taking stock at various locations.

The position will be superannuable under the terms of the British Electricity Authority's Superannuation Scheme.

The salary will be in accordance with Grade 1 (£310-£390), or Grade 2 (£390-£450) of the National Joint Council Agreement. Appropriate travelling and subsistence allowances will be payable according to the B.E.A. Scales.

Applications must be submitted on the appropriate form which can be obtained from the Divisional Establishments Officer, at the under-mentioned address, and when completed, should be delivered not later than May 8, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham. (E 429)

BRITISH ELECTRICITY AUTHORITY

South Western Division

NEWTON ABBOT GENERATING STATION
ASSISTANT SHIFT CHARGE ENGINEER

APPLICATIONS are invited for the position of Assistant Shift Charge Engineer at Newton Abbot Generating Station. Salary and conditions in accordance with N.J.B. Schedule, Class "F," Grade 9. (Salary range £538-£560 p.a. at present.)

Applicants should have good technical qualifications and a sound knowledge of the operation and maintenance of generating plant.

The appointment will be subject to superannuation under the terms and conditions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, qualifications and experience, should be addressed to the Divisional Secretary, British Electricity Authority, South Western Division, British Electricity House, 26 Oakfield Road, Bristol 8, to arrive not later than April 28, 1950.

R. C. BARRETT,
Divisional Secretary.

April 13, 1950. (E 414)

BRITISH ELECTRICITY AUTHORITY

APPLICATIONS are invited for the post of DISTRICT LABOUR RELATIONS OFFICER, North Western district, with headquarters at Manchester. Candidates should have a wide experience in industrial negotiations, a knowledge of the agreements relating to the electricity supply industry and be thoroughly familiar with committee procedure.

The appointment, which is superannuable, will be made within the provisional salary range of £1,200-£1,400 per annum, the point of entry being dependent on qualifications and experience.

Applications, stating age, salary and full particulars of qualifications and experience should be sent to D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London W.1, quoting reference AE/58. The closing date for the receipt of applications is May 5, 1950. (E 427)

BRITISH ELECTRICITY AUTHORITY

APPLICATIONS are invited from suitably qualified candidates for the post of an ASSISTANT in the Overseas Liaison Branch at their Headquarters in London.

This Branch is responsible for collecting from overseas sources technical and other information relating to the electricity supply industry and for its presentation in pre-digested form to the departments interested. The Branch is also closely connected with the Authority's representation at international conferences and with the conducting of foreign visitors to the Authority's installations.

Candidates should have a good general and technical education, preferably to degree or Higher National Certificate standard, together with some knowledge of one or more European languages. Preference will be given to applicants with fluent French or Italian.

The starting salary will be in accordance with experience and qualifications, within Grade 4 of Schedule "C" of the new N.J.B. Agreement (£544 to £949 per annum, plus 5 per cent. London Weighting). The successful candidate will be required to contribute to the Authority's Superannuation Scheme.

Letters of application, stating age, qualifications and experience, present appointment and salary, should be addressed to D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London W.1, quoting reference AE/57. Closing date for the receipt of applications is May 5, 1950. (E 428)

LONDON ELECTRICITY BOARD

Southwark District Southern Sub-Area

ENGINEER (OPERATION AND MAINTENANCE)

APPLICATIONS are invited for the above appointment at Penrose Street, Southwark, S.E.17.

Applicants should possess technical qualifications equivalent to those of the Higher National Certificate, and preferably be Corporate Members of the Institution of Electrical Engineers. A sound electrical training is essential, together with a wide experience of underground distribution systems and mains administrative work, and a good practical knowledge of Rotary Plant, Street Lighting and a.c./d.c. changeover works.

The provisional salary will be £700 per annum inclusive, pending grading of the post under the revised agreement of the National Joint Board.

Application forms, obtainable by sending an addressed foolscap envelope to Establishments Officer, 46/47 New Broad Street, E.C.2, returnable not later than May 1, 1950. Please quote reference EST/V/731/T on envelope and all correspondence. (E 426)

KENT COUNTY COUNCIL

APPLICATIONS are invited for an appointment as a SENIOR ENGINEERING ASSISTANT (Electrical), in the Buildings Department, in A.P.T. Division, Grade VI (£595-£680).

The post is superannuable and the successful candidate will be required to pass a medical examination.

Applicants must be corporate members of the Institution of Electrical Engineers and be capable draughtsmen with good experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work. The duties will include the preparation of drawings, inspection of premises and supervision of installations.

Applications, on forms obtainable from the County Architect, Springfield, Maidstone, must be delivered to him not later than 14 days after the appearance of this advertisement.

W. L. PLATTS,
Clerk of the County Council.

County Hall, Maidstone.
April 6, 1950. (E 396)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment :—

SHIFT CHARGE ENGINEER—Letchworth Generating Station.

Salary in accordance with the revised N.J.B. Schedule, Grade 7, Class " D " (£563-£573 per annum).

Applicants should have served an apprenticeship and obtained an ordinary National Certificate in electrical and/or mechanical engineering or equivalent and possess experience in the operation of power stations.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than April 28, 1950. Envelopes should be endorsed "Shift Charge Engineer, Letchworth."

W. N. C. CLINCH,
Controller.

Northmet House, Southgate, N.14. (E 371)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

AMENDED ADVERTISEMENT
CHEMIST—NORTHAMPTON

APPLICATIONS are invited for the appointment of Chemist at the above Generating Station. The salary will be in accordance with the revised National Joint Board Schedule, Class "F," Grade 8, commencing at £565 per annum. This grade is provisional and subject to determination by the appropriate organisations.

Candidates should have had a good experience in modern power station laboratory work, covering analysis of fuel, water and oil, be thoroughly conversant with water softening and treatment, and have some knowledge of problems relating to corrosion and boiler fouling.

Conditions of service will be governed by the revised National Joint Board Agreement.

The post will be superannuable under the British Electricity Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Establishments Officer at the under-mentioned address, and should be returned to him not later than May 8, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham.
April 12, 1950. (E 430)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

APPLICATIONS are invited for a position as TECHNICAL ACCOUNTANCY ASSISTANT in the Board's Edinburgh Sub-Area at a commencing salary, which is provisional pending the adoption of a nationally negotiated scale, within the range of £570-£630. Preference will be given to candidates holding recognised qualifications. The appointment is superannuable and the successful candidate may be required to undergo medical examination. Applications, with particulars of age, experience and qualifications, to be in the hands of Mr. G. T. Allcock, Sub-Area Manager, 3 Dewar Place, within 14 days of the appearance of this advertisement. (E 425)

A CABLE SALES ENGINEER, with good personality and sound electrical qualifications, required immediately to supervise agencies in Far East. Youth, energy, technical ability, overseas cable sales experience, all desirable. Post will be based on Singapore. All types power and telephone cables; copper wires and strands; covered wires; cable accessories. Salary according to experience; general allowances for expenses, travel, leave; preliminary training and refresher course on full pay in London factory. Similar position also available to cover India, Pakistan, Ceylon.—Write full particulars to Managing Director, Enfield Cables Ltd., Brimsdown, Middlesex. (E 420)

A LARGE well-known Engineering Company in Yorkshire has a vacancy for a competent ELECTRICAL DESIGN ENGINEER. The successful candidate will be expected to undertake original design work on a.c. or d.c. machines up to 500 h.p. Excellent staff conditions, and a salary commensurate with duties involved.—Write, giving full particulars, quoting reference 758, to Box No. 1175, Electrical Times. (E 348)

AFRICAN CABLES LTD., Transvaal, require the services of TEST ENGINEER; single man preferred. Minimum qualification: Higher National Certificate Electrical Engineering for electrical and physical laboratories of factory manufacturing rubber, P.V.C., and paper cables. Duties include control testing to ensure compliance with specifications. Experience in cable factory desirable. Salary £850 per annum inclusive cost of living allowance; passage paid to South Africa.—Reply to Box No. 1213, Electrical Times. (E 421)

APPLICATIONS are invited for the position of WINDING SHOP FOREMAN in our Electric Motor Department.—British Bronson Ltd., Stocklake, Aylesbury. (E 393)

ARMATURE WINDER, experienced a.c. d.c. rewinds and repairs. London area.—Write, Box No. 1201, Electrical Times. (E 403)

CONSULTING ENGINEERS require ASSISTANT ELECTRICAL ENGINEER-DESIGNER, capable of laying out and specifying complete electrical installations for large buildings. Apply in writing, stating qualifications, experience and salary required, to Oscar Faber and Partners, 4 Verulam Buildings, Gray's Inn, W.C.1. (E 412)

DESIGNER DRAUGHTSMAN for contactor control gear, mainly d.c. Higher National Certificate or equivalent, required by north-east coast engineering company.—Reply, stating age, experience and salary required, to Secretary, Box No. 1151, Electrical Times. (E 293)

DESIGNER DRAUGHTSMAN required for the engineering laboratory of a large light engineering firm in the West London area for development work. Should have a knowledge and experience of tool design.—Apply, giving details of age and experience, to Box No. 1215, Electrical Times. (E 436)

FORD MOTOR COMPANY

SHIFT CHARGE ENGINEER

THE FORD MOTOR COMPANY require to fill the appointment of Shift Charge Engineer in their power house. Present capacity equivalent to 70,000 kW. Candidates must have a sound technical training and be experienced in all branches of engineering associated with the design and operation of high-pressure boiler and turbine plant.

They should be in possession of technical qualifications admitting to corporate membership of a recognised professional institute. Salary £750 p.a. The post is permanent and pensionable.

Applicants should reply very fully to **Labour Relations Division, Ford Motor Company, Dagenham,** quoting reference **E.JK.H.CE.** Those who replied to our previous advertisement for Assistant Shift Engineer or Assistant Mechanical Maintenance Engineer need not re-apply for this post. (E 332p)

CONTROL ENGINEERS

CONTROL ENGINEERS for network operation, required by Major Oil Company in Middle East for control centre covering operation of extensive overhead and underground transmission and distribution networks up to 66 kV. Applicants must be experienced in the operation of indoor and outdoor metal-clad switchgear at all voltages, transformers and associated substation equipment. Age not over 35. Attractive salary plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting

Dept. F.116 to Box No. 2584 at 191 Gresham House, E.C.2. (E 389p)

ELECTRICAL CONTRACTORS (Westminster) have vacancy for CLERK, preferably with some experience of invoicing. Permanency for young, steady man.—Write, giving concise particulars of experience, age, and salary required, to Box No. 1209, Electrical Times. (E 417)

ELECTRICAL DESIGNER for d.c. and a.c. machinery up to 500 kW. Higher National Diploma or equivalent, required by north-east coast engineering company.—Reply, stating age, experience and salary required to Secretary, Box No. 1153, Electrical Times. (E 294)

ELECTRICAL ENGINEERS required for service in Middle East. Applicants should (*a*) possess Ordinary or Higher National Certificate and have had full apprenticeship with heavy electrical equipment manufacturers or with a large colliery or allied fully electrified industry, or (*b*) possess a degree and have had two years' technical apprenticeship with similar firm to above. In each case applicants must have had at least three years subsequent experience on the installation and maintenance of heavy electrical equipment. Maximum age limit 35 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.191, to Box No. 2593, at 191 Gresham House, E.C.2. (E 415)

ENGINEER DRAUGHTSMAN wanted by consulting engineers in Westminster. Must have wide experience in the preparation of specifications and layout drawings for electrical installations in schools, hospitals, factories, office blocks.—Apply, stating age, experience, qualifications and salary required to Box No. 1207, Electrical Times. (E 409)

FOREMAN SUPERINTENDENT required for large coil-winding shop manufacturing a big variety of coils. Applicants must be thoroughly conversant with all aspects of winding and finishing and in addition, accustomed to handling both male and female labour. Good salary will be paid to one able to get output with quality. House will be provided.—Box No. 1169, Electrical Times. (E 329)

JUNIOR DRAUGHTSMAN required for detail and assembly drawing, modifications and schedule preparation for manufacturers of electro-mechanical devices in West London area.—Write full details of experience and salary required to Box No. 1197, Electrical Times. (E 401)

JUNIOR TRANSFORMER SALES ENGINEER required by large manufacturing company in N.E. London. Degree or equivalent essential and previous transformer experience an advantage.—Apply, stating details of education, training, experience and salary required, to Box No. 1189, Electrical Times. (E 386)

LABORATORY MECHANIC required for Electrical Laboratory in South-West London for mechanical and electrical work on the construction of experimental equipment; should be able to wire from circuit diagrams. —Box No. 1193, Electrical Times. (E 388)

FITTERS AND WINDERS experienced in large repair shop practice, wanted urgently. —Apply, in person or writing, Dowding and Mills, Ltd., Camp Hill, Bordesley, Birmingham 12. (E 344p)

W. C. HOLMES & CO. LTD.,

TURNBRIDGE, HUDDERSFIELD

Have vacancies in their Electrical Precipitation Department for :—

CHEMIST AND DEVELOPMENT ENGINEER

ESTIMATOR

DRAUGHTSMEN

Previous knowledge of Dust Precipitation an advantage in each case, but not essential.

The Chemist and Development Engineer will be responsible for investigation of Detarring and Dust Precipitation problems, and must be able to represent the firm when necessary. Interesting and progressive work.

Pension scheme, canteen and other amenities.

Applicants should state age, qualifications and salary required. (E 431p)

LIGHTING SALES ENGINEER required for West Country and South Wales by large electrical manufacturers. E.L.M.A. members. Must have an electrical background, preferably National Certificate. Lighting experience preferred. Car driver essential. Write giving full particulars of age, previous experience and salary required to Box No. 1205, Electrical Times. (E 408)

MOTOR DESIGNER required for the F.H.P. motor laboratory of a large light electrical engineering company in the West London area. Applicants should have a sound technical and practical training, with initiative to accept full responsibility of a project from the initial design stage to factory production. Excellent prospects if qualifications and experience are suitable.—Apply, giving details of age, education, and job history, to Box No. 1217, Electrical Times. (E 437)

PRODUCTION Control. SENIOR ASSISTANT required, able to control production planning, scheduling, machine shop loading, assembling and progressing. Experience in light electrical engineering essential. Interesting work with prospects for the right man. 5-day week. Canteen. West London district.—Write full particulars and salary required to Box Nc. 1191, Electrical Times. (E 387)

REPRESENTATIVE required for the Lancashire area with prospects of appointment as Area Manager. Good salary plus expenses. Knowledge of industrial lighting equipment an advantage. Write, stating age and experience, which will be treated in confidence.—Box No. 1167, Electrical Times. (E 385)

REQUIRED for Generating Station in the Far East, one SHIFT ENGINEER with sound technical training and good general engineering experience. Must have had not less than three years in a modern steam power station and a thorough knowledge of watertube boilers, turbo alternators, E.H.T. switchgear and auxiliary plant. Liberal salary with H.C.L. allowance, free quarters, electricity, fuel and medical attendance. Excellent Provident Fund.—Applications, stating age, qualifications, present position, married or single, and full details of education and experience, to Box 445 L.P.E. 110 St. Martin's Lane W.C.2. (E 395)

SALARIED REPRESENTATIVE required with established connection London accessories buyers; some contracting experience an advantage. Commission and good prospects for able man.—State age, previous experience and basic salary required, Box No. 1211, Electrical Times. (E 418)

SALES ENGINEER and Representative having good connection with users of mains cables required for Midlands Counties by old established cable manufacturing company.—Write, stating age, experience and remuneration required, to Box No. 1203, Electrical Times. (E 407)

SALES REPRESENTATIVES (4); (a) Yorkshire; (b) Midlands; (c) South Wales; (d) South Coast, for well-known Electric Light Fittings Manufacturers. Progressive position for keen and energetic men with proved qualifications and connections.—Applications, stating age, experience, etc., will be treated in strict confidence, and should be addressed to Micramatic Ltd., Wootton Mount, Old Christchurch Road, Bournemouth. (E 368)

SENIOR DRAUGHTSMAN for detailing L.T. metalclad switchgear, modern factory conditions, 5-day week, good rates, and assistance in obtaining accommodation.—G. P. Dennis, Ltd., Fleming Road, Speke, Liverpool 19. (E 232)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

TECHNICAL ASSISTANT for interesting work in small laboratory engaged in development of mass-produced electrical switchgear and control devices in modern West London factory. Minimum qualifications, Ordinary National. Laboratory experience essential.—Box No. 1195, Electrical Times (E 400)

TECHNICAL ASSISTANT required in High Voltage Cable Testing Laboratory. Age 20-25. Good technical education essential.—Write, giving full details of experience and qualifications, also age and salary required, to: Box No. 1219, Electrical Times. (E 438)

TELEPHONE MECHANIC. A vacancy exists at a large works in Neath district for a Telephone Maintenance Mechanic, experienced in the maintenance of Strowger type automatic exchange apparatus and associated equipment. He must be capable of locating and repairing faults on overhead lines and multicore telephone cables and on subscribers' apparatus.—Apply, Box No. 1131, Electrical Times, stating experience, etc. (E 259)

TESTING ASSISTANT urgently required for Dry Core Telephone Cable Department in modern cable factory. Must be fully conversant with test requirements for British post office specifications covering twin local, star quad and multiple twin construction. Age approx. 25.—Full details of experience and salary required to Messrs. Aberdare Cables, Limited, Aberdare, Glam. (E 394)

TWO SALES ENGINEERS for London and Nottingham areas required by E.L.M.A. manufacturers of lamps and lighting equipment. Electrical training and experience. Nat. Cert. E.E. preferred. Lighting knowledge an advantage. Car provided. Must have urge to sell. Remuneration according to qualifications.—Write, giving full particulars of age, experience and salary required, to Box No. 1199, Electrical Times. (E 402)

WORKS ENGINEER required to control new installation and maintenance of electrical, heating and building construction side, for firm having ten (10) works (each 100-200 men) throughout the country. Head Office in south-east, from where would be working. No accommodation available. Superannuation scheme.—Apply, Box No. 1095, Electrical Times. (E 186)

YOUNG ENGINEERS wanted for Contracts and Sales Department of electrical manufacturers near London. Keen, energetic men, age approximately 25 years required. Positions have prospects of outside sales engineering later. —State age, experience and salary required to: Box No. 1183, Electrical Times. (E 383)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Phone: Chiswick 5105. (A 20)

WANTED.—D.C. and a.c. ball-bearing MOTORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London N.1. (A 13)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady St., Bethnal Green, E.1. (A 1)

WANTED, ROTARY CONVERTORS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

ELECTRICAL

REPAIR AND REWINDING

BUSINESS WANTED

IN

London Industrial Area

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Room for Development

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BOX NO. 1171, ELECTRICAL TIMES

(E 345p)

WANTED.—Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details to Midland Iron and Hardware Co., Cradley Heath. (A 5)

APPOINTMENTS WANTED

CORPORATE MEMBER, I.E.E., age 36, 18 years in supply industry. Present position district engineer, salary £800 p.a., requires job with outlet for individual effort either in ELECTRICAL ENGINEERING or otherwise. Will undertake secretarial or any other qualifications that may be advantageous.—Box No. 1133, Electrical Times. (E 260)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed.—Edgware 8631 (4 lines). Service Electric Co. Ltd., Stanmore, Middx. (D 324)

ARMATURE ROTOR AND STATOR WINDING. We specialise in the repair and rewind of all types of electrical machines from fractional h.p. upwards. Special departments for vacuum cleaners, dryers, portable tools, etc. All work fully guaranteed.—Walter Crane, Greencoat Electrical Works, Westgate, Wakefield. Telephone 2172. (A 4)

CASTINGS, Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (D 326)

ZEROS REFRIGERATORS.—Complete range of repair and service now available. Equipment reconditioned to conform to pre-war manufacturers' specifications.— Time Engineers, Refrigeration Specialists, 60 Southend Road, Rainham, Essex. Tel.: Rainham 2358; or Southern Area Agency. Tel.: Springpark 4217. Electrical Spares supplied to the trade. (A 639)

FOR SALE

Fourth Sale *By Order of the Ministry of Supply*

G R

CENTRAL ORDNANCE DEPOT,
BICESTER, OXON
Important Sale by Auction of the
GOVERNMENT SURPLUS WIRELESS AND
ENGINEERING STORES AND EQUIPMENT
comprising:

At CENTRAL ORDNANCE DEPOT, BICESTER: Large quantity of Secondary Batteries; Large quantity of H. T. Batteries; Shackles; Non-Skid Chains, various types; Search Coils; Transformers; Condensers; Cable and Aerials; Chain Spare Parts; Motor Cycle Spares; Large quantity of Grease Guns; Paint; Open Ended and Adjustable Spanners; Petrol Tanks; Canvas Covers, etc.

AT NO. 12 COMMAND ENGINEER STORE HOUSE, HATTON JUNCTION, WARWICK: 150 Portable Boilers, 10, 15 and 20 gallons; Steam Heated Hot Closets; Electric Lamps and Wiring Equipment, etc., which

MIDLAND **M**ARTS **L**IMITED;

will sell by auction on the site at Central Ordnance Depot, Bicester, on
Tuesday, May 2, 1950
at 11 a.m. prompt.

View Days: Thursday, Friday and Monday, April 27, 28, and May 1, 9.30 a.m.-4.30 p.m., and on the morning of the Sale, 8.30-11 a.m.

Catalogues: Price 6d. (postal orders only, no stamps) to admit two persons on view days and one person on sale days may be obtained of the Auctioneers, MARKET SQUARE, BICESTER, OXON (Tel. 73). (E 392)

CABLES & WIRE

PYROTENAX 7 core ·003 CABLE, new coils ex stock.—Boyce Weir & Co., 48 Whiteley St., Milnsbridge, Huddersfield. (E 350)

BANKRUPT CABLE

TWIN TRS	per 100 yds	SINGLE VIR	per 100 yds
3·029	59/6	Taped & braided	
with earth	66/9	3·029	22/-
7·029	89/6	7·029	36/-
with earth	102/6	1·044	17/3
1·044	45/6	14·36 TT MAROON	14/9 for 50

Cash with order. All goods guaranteed, add part carriage on small orders. SEND FOR 'SMALL QUANTITY' discounts and bakelite accessories list.

BRITISH DISTRIBUTING CO.
66 HIGH STREET, LONDON N.8 (D 517p)

TINNED STEEL ARMATURE BINDING WIRE. All even numbered sizes from 16 s.w.g. to 28 s.w.g. supplied on 7 lb., 14 lb. reels.—Frederick Smith and Co., Wire Manufacturers Ltd., Caledonia Works, Halifax. (C 417)

TOUGH RUBBER CABLE available, all sizes and types; non-standard lengths (25 yds to 50 yds). Special prices quoted for regular buyer. Must be a user guaranteed strictly to BS87.—Box No. 1119, Electrical Times. (E 251)

V.I.R. TAPED AND BRAIDED. Fully complying with BSS specification, but non-standard lengths. First rate quality, ex works. Must be actual user.—Box No. 1121, Electrical Times. (E 252)

DOMESTIC APPLIANCES

AUTO-ELECTRIC KETTLES 4 pt. 1½ kW 28/2. Also Grubb IMMERSION HEATERS (no tax). Cable, etc. Send 1d. stamp for lists.—Northern Industries, Snow Hill, Manchester 4. (D 50)

IMMERSION HEATERS. Grubb 2 kW and 3 kW standard voltages, all lengths, 12 in. to 36 in. Also 4 kW (non-taxable), 16 in. to 36 in. Fully guaranteed and immediate delivery. For illustrated brochure, latest lists and trade terms, write distributors, John Owner and Co., Springfield Road, Birmingham 13. Tel.: Spr. 2939. (C 392)

ENGINEERING PLANT & MATERIALS

ARC WELDING PLANT. One Murex Portable 9 kW A.C. Arc Welding Plant, 30 V 300 amps, c/w 17 h.p. 3 ph motor in good condition, £65.—Saker and Davis, 58 Theobalds Road, W.C.1. (E 432)

FOR sale, MOBILE AIR COMPRESSOR 20 c.f.m. Reavall two stage compressor, 8 h.p. Petter petrol engine mounted on trailer with brakes. Excellent condition, £65. Several a.c. Motors, example: 10 h.p. Brooks surface cooled, £18; G.E.C. 20 h.p. enclosed, V, £20.—J. Bateson Ltd., Electrical and Mechanical Engineers, Gibraltar Works, Parkinson Lane, Halifax. (E 314)

LADDERS (wooden and aluminium, all types), Trestles, Steps, Handcarts, etc., from Ramsay and Sons (Forfar) Ltd., Forfar (Tel. 172). (C 603)

GENERATING PLANT

ALTERNATORS from stock, 400/440 V, 3 phase, 50 c/s, 4-wire, with exciters and switchboards: 80 kW "Westinghouse" 1,000 r.p.m., 40 kW "E.C.C." 750 r.p.m., 28·1 kVA "Crompton-Parkinson" 1,500 r.p.m., 15 kW "G.E.C." 1,500 r.p.m. For full details, write: Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (E 109)

DIESEL ALTERNATORS in stock, 1 and 3 phase, standard voltages, up to 100 kVA; details post free on request.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (E 108)

MOTOR GENERATING SETS. Built to customers' requirements of new and used plant. Many in stock at Wembley, inspection invited. Please send us your inquiries. We can help you to save time. Over a THOUSAND MACHINES ALWAYS IN STOCK.—Dynamo and Motor Repairs Ltd., Wembley Park, Middlesex. Telephone: Wembley 3121 (4 lines). Also at Phoenix Works, Belgrave Terrace, Soho Road, Birmingham. Telephone: Northern 0698. (A 2)

100 KVA MODERN DIESEL ALTERNATOR SET. Comp.: vert. 4-cyl solid injection oil engine on baseplate coupled to 400/230 V 3 phase 50 c/s 1,000 r.p.m. alternator. Details on request.—Thos. W. Ward, Ltd., Albion Works, Sheffield. (E 112)

250 kW STEAM ENGINE-DRIVEN ALTERNATOR SET by Belliss & Morcom Ltd., for 100 lbs pressure. Recently completely overhauled by makers at a cost of £260. First-class condition; £975. Can be seen working by appointment.—L. G. Harris & Co. Ltd., Stoke Prior, Nr. Bromsgrove, Worcs. (E 405)

375 KVA L.D.M. ALTERNATOR, 400 V, 3 phase 50 c/s, 4-wire 375 r.p.m., with exciter, mounted on baseplate, with single pedestal bearing.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (E 114)

LIGHTING EQUIPMENT

PURLEY CHOKES AND BALLASTS. Silent operation, excellent performance, efficient, long life, vacuum impregnated, quick delivery. Low price (e.g. Purley Queen, 80 watts, 14/6 each, less quantity and cash discounts). Quotations for export.—F. W. Blanshard, Ltd. (Dept. ET), Purley, Surrey. (E 343)

METERS

A.C. and D.C. QUARTERLY & PREPAYMENT METERS. Electric Meter Co., Melville Lane, Torquay. (E 441)

HOUSE SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (C 51)

HOUSE SERVICE METERS from 5/-. Guar. two years. Electric Meter Co., Melville Lane, Torquay. (E 442)

METERS, a.c. and d.c., new and reconditioned, all types: quarterly, single and 3-phase, 3 and 4 wire, 2½ to 1,000 amp; prepayment, single and double tariff, single, dual, and triple coin, fixed and variable tariff, 2½ to 50 amp. M.D.I., Billiards Switches, Rent Collectors. Prices from 5/-, carriage paid. Two-year guarantee; immediate delivery.—Illustrated catalogue from The Electric Meter Co., 16 Melville Lane, Torquay. (E 440)

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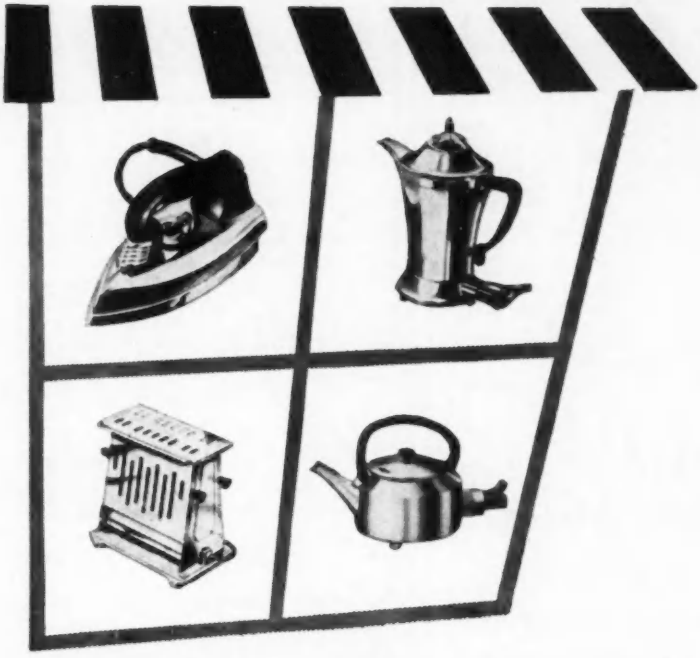

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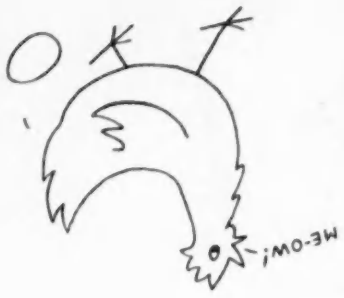

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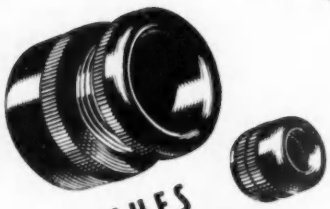

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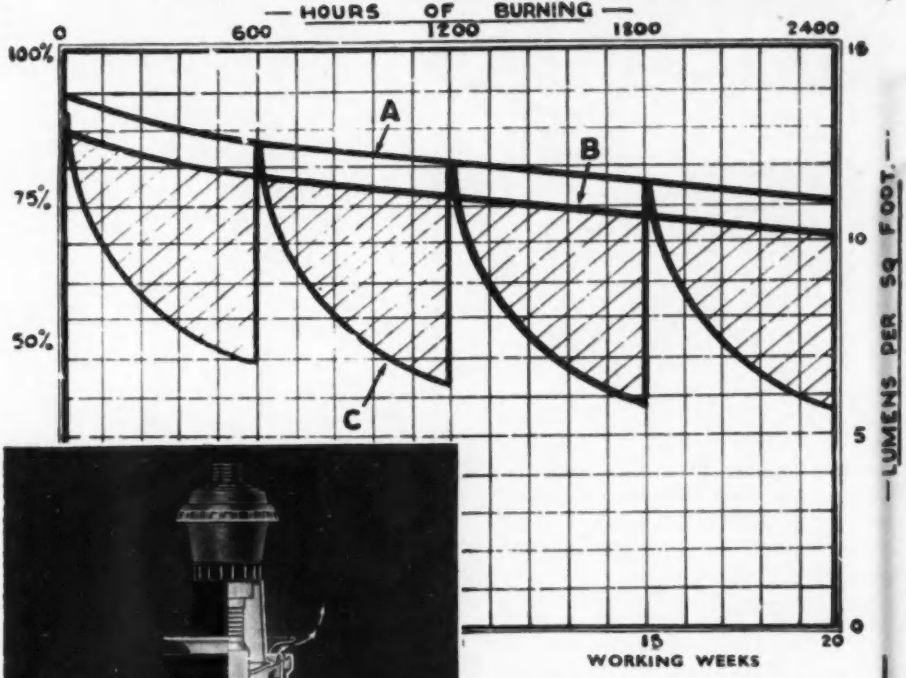

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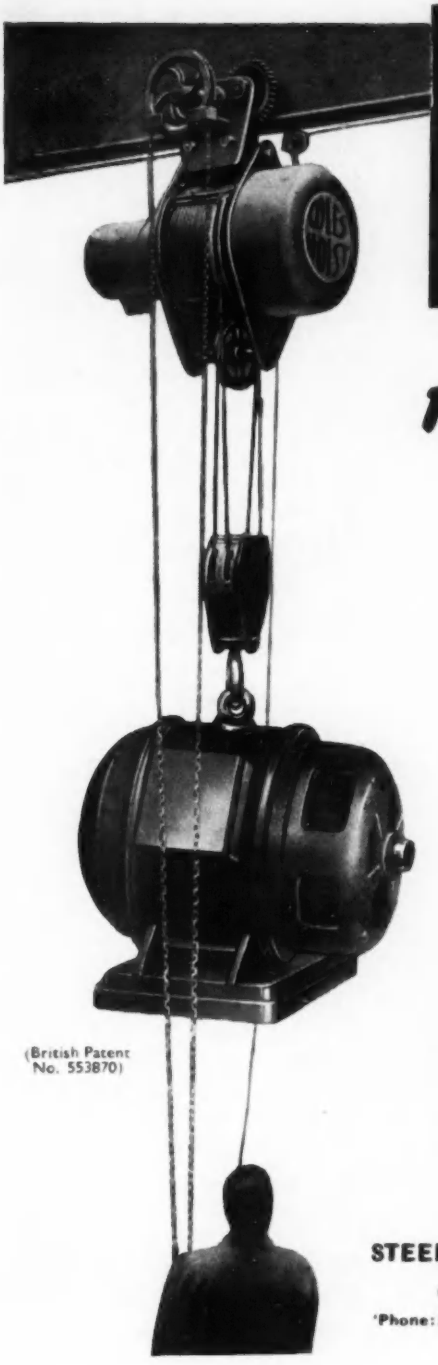

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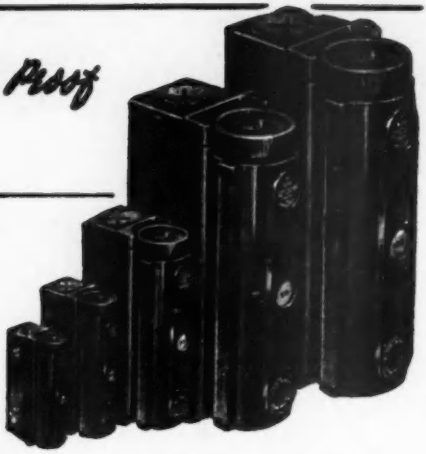

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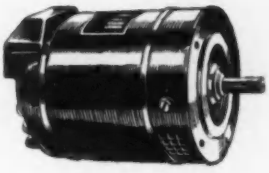

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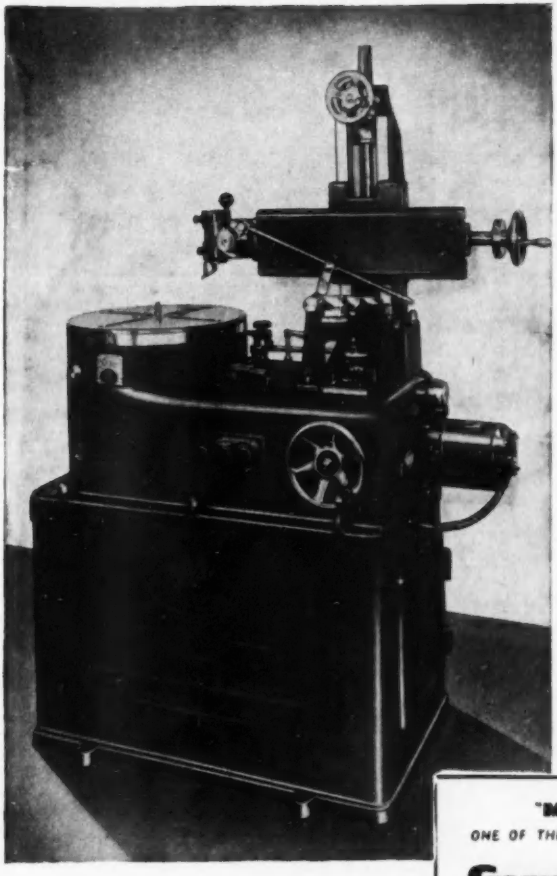

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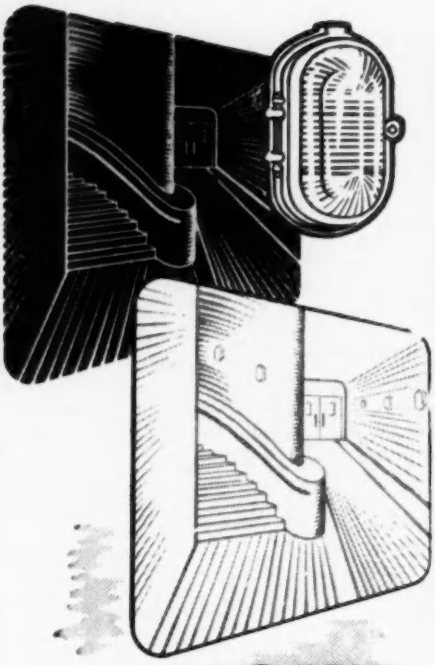

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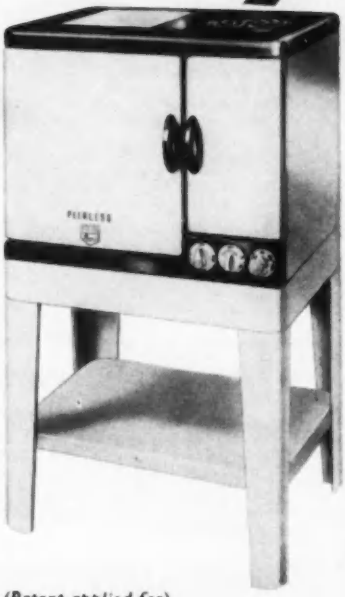

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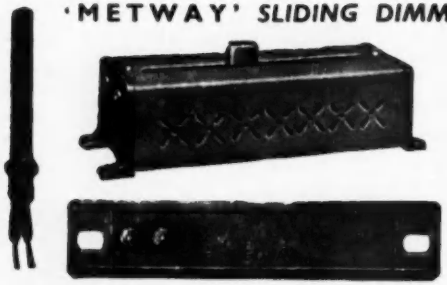

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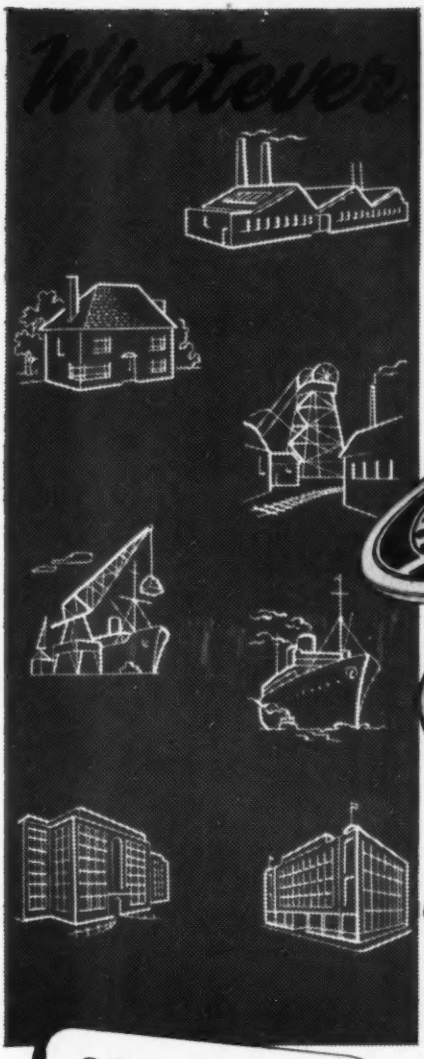

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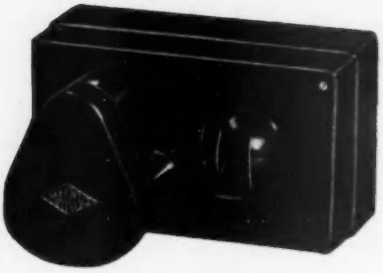

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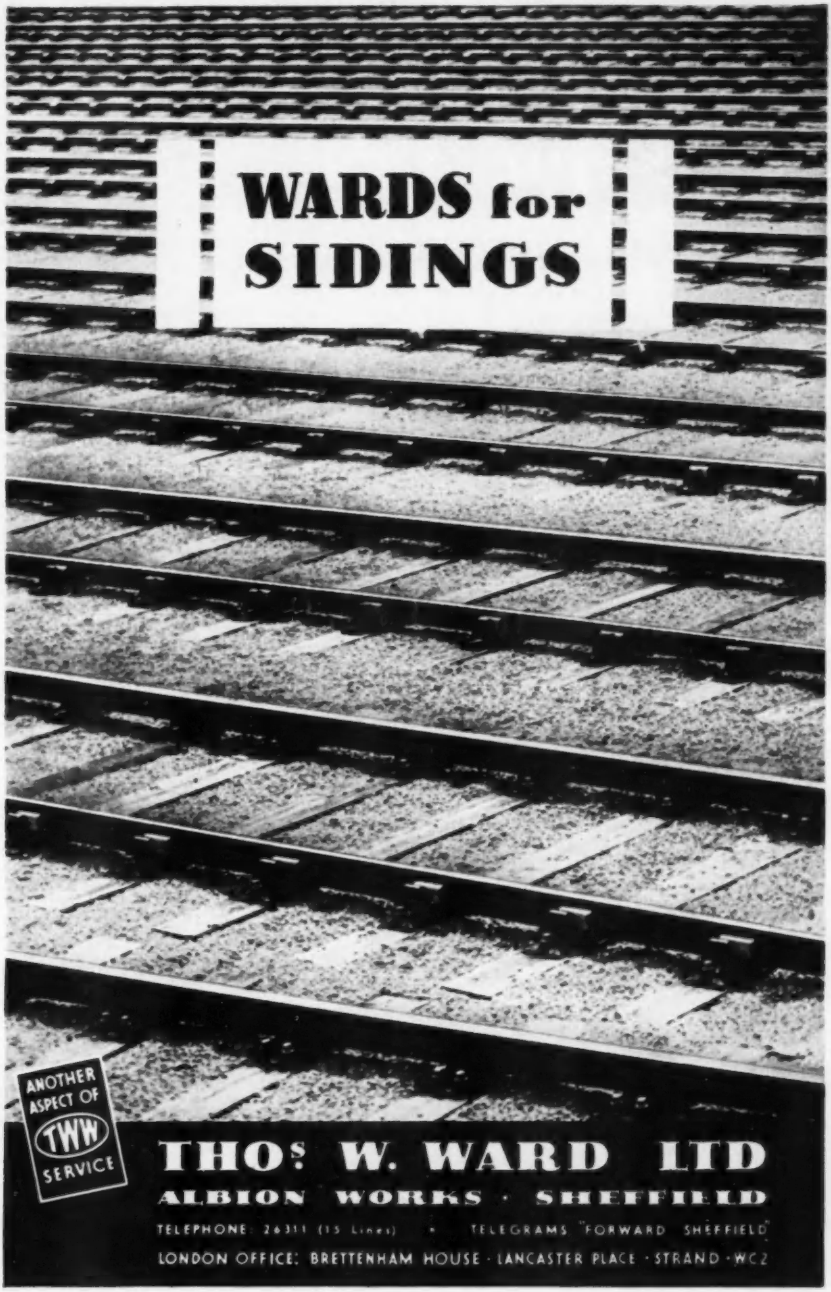
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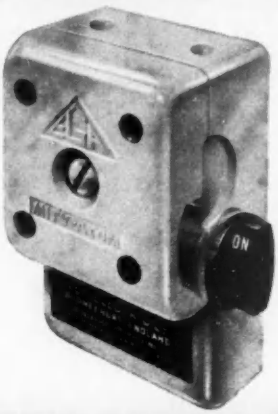

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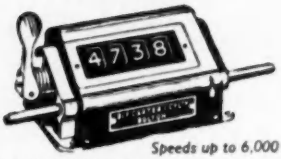

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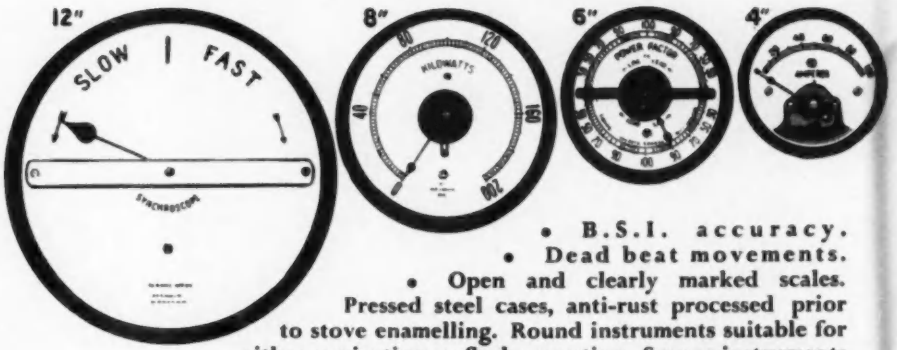

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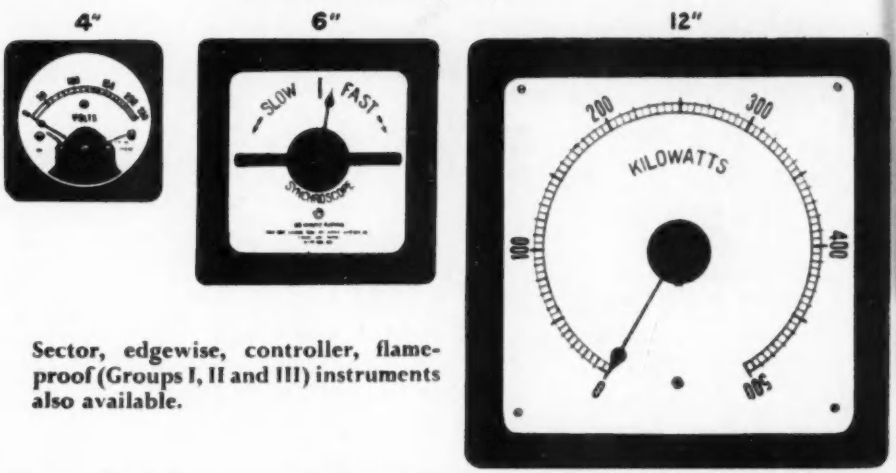

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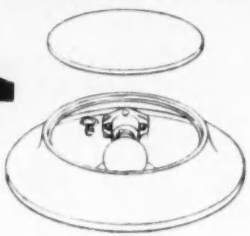

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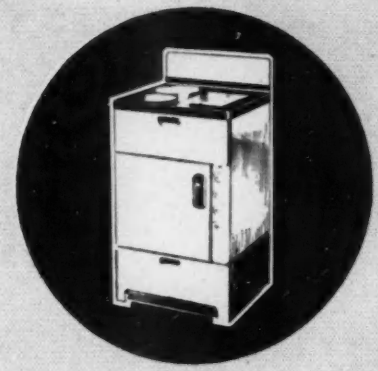

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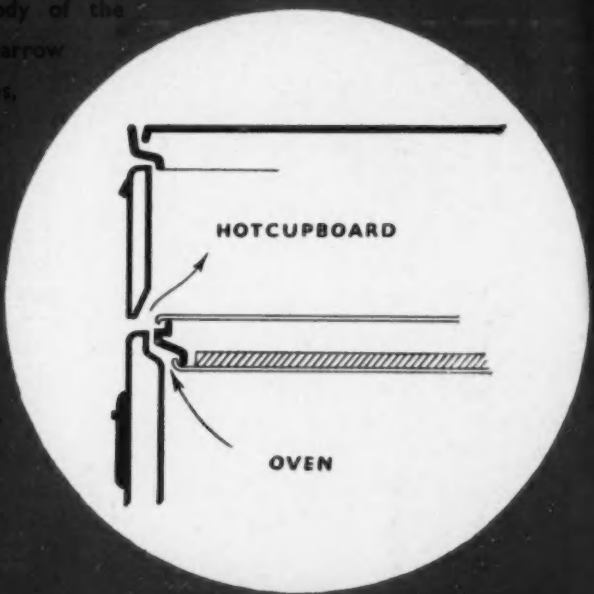

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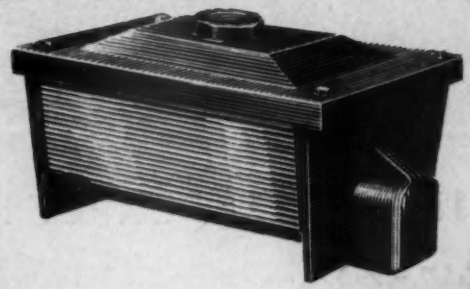

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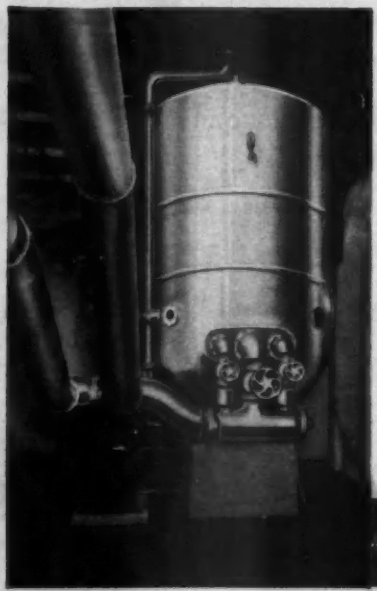

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